TOTAL REWIND: THE TALE OF THE CASSETTE TAPE

australian hi-fi

TOP SPINNER

Rega's iconic Naiad concept becomes a $25K reality

PURSUING PERFECTION

PSB throws the kitchen sink at its reference tower speakers

TRÈS BIEN!

Advance Paris arrives in Australia with vim… and VU meters

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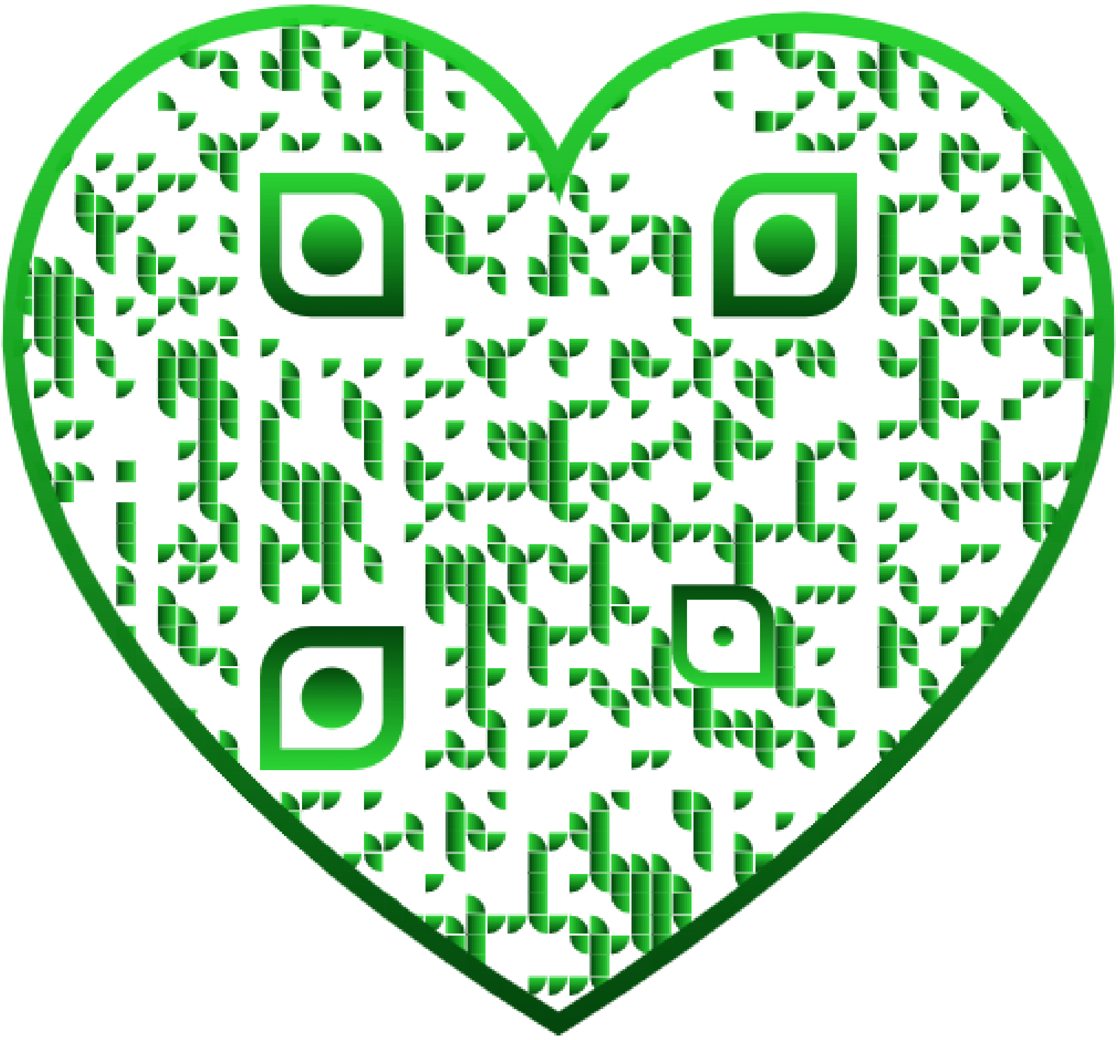

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Editor's lead in

I remember this revelatory day in 2017 like it was yesterday. Following an ill-timed holiday, during which my colleagues had received the KEF LS50 Wireless, I walked into the test room and found the two speakers hooked up playing music. I'd read about these "wireless LS50s" when they were announced the November prior, and now here they were in front of me — just two regular-sized speaker cabinets plugged into the power sockets behind them, and to one another via an ethernet cable; no transmitter box, no source physically tethered to them. Where was this music coming from? 'Only' Bluetooth, their top-panel input display revealed, though their killer feature was undoubtedly integrated wi-fi and network streaming.

While I'd tested powered and active speakers from the likes of Dynaudio, Dali, Linn and Meridian before, none of them had combined such an assortment of features in such an elegant and accessible (~$4,000) two-box format — primarily as they hadn't integrated wi-fi streaming, either at all or as smartly.

"Well, this is pretty neat," I remember thinking as I sat and listened for a while (I believe some indie-pop by Spoon was playing), trying to mentally erase the interconnecting cable that hung between the speakers and somewhat spoiled the otherwise unsullied setup (something that was, thankfully, physically erased for the sequels released two years later).

'Is this what the hi-fi system of the future should look like?', we all asked ourselves. Six years later, the fully integrated streaming stereo speaker road has been travelled down by several brands looking to offer performance and convenience in a best-of-both-worlds system. PSB, JBL, B&W, Triangle, Piega, Sonus Faber and Kii Audio have a pair or two under their belt, and some can be found in the upper echelons of the hi-fi market in Cabasse Pearl Pelegrina and Dynaudio Focus territory too. But I expected the path to be somewhat as heavily trodden as Disneyland's Main Street on the first day of the summer school holidays by now.

Testing JBL's largest example of this kind, the 4329P, earlier this year has spurred my desire for more. As you'll know, much about hi-fi is a compromise, and by their very nature (that is, cramming multiple components that are traditionally each housed in dedicated boxes, into just two cabinets), the JBLs and the like are compromised. Compromised in terms of their performance due to a) that cramming (sonic sacrifices are inevitable when circuitry for different applications share spaces and cannot be properly isolated), and b) the likelihood that the manufacturer behind them is a specialist in speakers or electronics but not both.

But for the price of what a budget-to-mid-priced system of separates would cost inclusive of stands and cables etc, the JBLs deliver a performance more mature than I'd previously heard from such a design at this level. Not much in it between them and a good comparable-cost separates system, truth be told.

JBL has taken its proven horn loudspeaker design and implemented the electronics into it very well, taking advantage of the all-in-one design's biggest strength — that every part, from streaming chips to amplifier modules to speaker components, is specifically chosen and executed to work together optimally, all under the control of one manufacturer.

I look forward to hearing what the newly announced Sonus Faber Duettos can do in the New Year, but more broadly I'm excited to see how good this all-in-one design can get, both in the (relatively) accessibly priced realm and beyond it.

Given that Class D amplification (with its facilitation of high-power outputs without high heat generation) is seemingly maturing and allowing for smaller products, and that DSP know-how and streaming architecture are going that way too, not to mention that there will likely be a continued whole-system demand for 'better from smaller', the path ahead of stereo speaker systems looks promising. If I could've asked Santa for one thing, it would probably have been hi-fi brands' 2024 roadmaps!

Speaking of the big fella, I hope you all had a restful Christmas break. And happy New Year to you — I have a feeling it will sound awesome.

rebecca.roberts@futurenet.com

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Contents

AUSTRALIAN HI-FI MAGAZINE ISSUE 534 – January/February 2024

Equipment reviews

20 TAGA Harmony TCD-50 CD Player

Despite its few operational quirks, this well-priced disc spinner, from a European manufacturer new to Aussie shores, is sure to please with its solid build and insightful performance.

28 Advance Paris A12 Classic Stereo Amplifier

This reviewer has just two criticisms of Advance Paris' integrated amp — and he admits they are "pretty weak sauce". The French brand may be new to Australia, but it has already made a great impression through its A12 Classic.

36 Vivid Audio Kaya S12 Loudspeakers

Vivid Audio has extended its high-end audio expertise to (in relative terms) sleeker and more compact enclosures, one of which is the Kaya S12. In the month this reviewer shared company with these unique, curvaceous bookshelf speakers, it is abundantly clear he had an absolute blast.

40 Serhan Swift Mµ2 Mk II Loudspeakers

It may carry 'Mk II' status, but Serhan Swift's latest design is, the Aussie brand says, "a totally new loudspeaker". Well, the freshness of this sequel certainly seems to have paid off, as indicated by the number of occasions the word 'exceptional' appears in this review.

australian hi-fi

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Features

6 **Audio News**
Cyrus TTP turntable; Yamaha CD-C603 CD changer; WiiM Amp streaming amplifier; Sonus Faber Lumina loudspeakers; Pro-Ject Perspective Final Edition turntable; Ruark Audio R810 radiogram; Rotel RAS-5000 streaming amplifier; Meze Audio Empyrean II headphones; Marantz CD50n streaming CD player & Model 50 stereo amplifier; Magico M7 loudspeakers; Luxman PD-191A turntable; Harman acquires Roon; Bowers & Wilkins Px7 S2e wireless headphones; Arcam Radia component range; Acoustic Energy Corinium loudspeakers

47 **History of Portable Audio: Part 3**
Billions of them were made. They'd fly to the moon, frustrate home computer users and launch the original mixtape. In this series' third instalment (we're halfway through now), Darren Yates looks back at the rough-and-tumble story of the audio cassette.

52 **Hi-Fi Primer**
The Compact Disc's star may have faded, but Ketan Bharadia explains how the silver disc still has a place for him, while offering advice on how to get the best sound from CD players — y'know, for those of us who aren't yet ready to consign their CD collection to the bin.

3 **Editor's Lead-In**
If I could've asked Santa for one thing last month, it would've been brands' 2024 product roadmaps. That way I could see if more stereo speaker systems are imminent — because I really hope they are.

Music

80 **Piano Test Tracks**
From rollicking Rachmaninoff concertos to glossy Debussy genius, this 11-strong curation reflects the bewildering array of styles, influences and compositions housed within the humble wooden frame of what is arguably our greatest instrument.

82 **Top Picks**
Peter Gabriel's first album of original material in over two decades is proof he can still write songs that turn the head and stir the heart. Meanwhile, there's a Van Morrison cover album that could fill a small jukebox, an ambitious, promising debut by English proggers Storm Deva, and more...

esoterica

56 **High-End Review #1**
The best turntable that one of the industry's biggest legends can produce also happens to be one of the best available at its level. "A must-listen for anyone interested in knowing just how good vinyl can sound," concludes this glowing review.

60 **High-End Review #2**
'Cost no object' loudspeaker designs where every cent has seemingly been put to squeezing out every iota of performance possible. "The rarest of all finds," says this reviewer, who also calls them some of the best-sounding he's ever heard, irrespective of price.

67 **Sound Travels**
The collaboration between a talented, meticulous industrial designer and, 15,500 kilometers away, an equally talented and meticulous electrical engineer has led to the creation of astounding products from Hulgich Audio. Tom Waters sits down with Nick Hulgich to get the brand's full story...

OUR FRONT COVER

PSB's flagship floorstanders set sky-high standards, while extraordinary sound is also delivered by Rega's reference deck. An Advance Paris amp also impresses.

Back with a bang

Arcam is back, back, back. You could argue the British hi-fi company never really went away, but its hi-fi separates output has been fairly muted of late.

That all changes with the launch of its all-new Radia family, a five-strong series of mid-range components that are incredibly tempting across looks, price and (as you'd know if you've so much as glanced at this year's What Hi-Fi? Award winners) performance.

Making up the range are the A5, A15 and A25 integrated stereo amplifiers, the CD5 CD player and the ST5 network music player.

All five sport a very sleek, all-black design with subtle yellow accents throughout for a 'contemporary' look (more on that below). Matching black and yellow remote controls come with each model, too. It's a rather strong visual statement and certainly a departure from previous Arcam products which have tended to stick to the more traditional, industrial look.

Arcam says this new aesthetic will define Arcam's image for years to come.

Jim Garrett, Senior Director of Product Strategy and Planning at Harman Luxury Audio, says: "With the Radia family, we've renewed our focus on intimate performance and embraced the very latest audio technologies. For today's audio enthusiasts, especially younger ones looking to get into a luxury audio system at a reasonable cost, the resulting solutions surpass not only our past offerings, but any product that's come before."

The A5 and A15 amps are Class A/B designs delivering 50 and 100 watts per channel respectively, while the flagship A25 ups the ante with a Class G design and 100 watts per channel (all into eight ohms).

All three models share key family features, starting with the new aluminium shell, the distinctive vents cut into the top, and a 'cowl' that hangs over the back panel to hide the connections. They each have a "high-quality" moving magnet phono stage built-in, with improved preamp stages featuring upgraded and fine-tuned components. A neat addition for the trio is two-way aptX Adaptive Bluetooth, letting you stream music wirelessly to the amps from your smartphone and simultaneously listen back on connected Bluetooth headphones.

The A5 and A15's digital circuitry is based on the ESS ES9018 DAC, while the A25 steps up to the ESS ES9280AQ chip. All amps feature analogue line-level and digital (coaxial and optical) inputs, with the A25 adding a USB-C input to the list. While the rest of the family has frosted, simplified TFT displays, the A25 sports an OLED screen. And as an added design flourish for the flagship model, the A25 also sports illuminated highlights around the volume dial that mimic the yellow paint on its siblings.

The CD5 CD player supports CD/CD-R/CD-RW disc formats and features a USB port for playing tracks (FLAC, WAV and MP3) from a flash drive. File support is up to 24-bit/192kHz, which is also unsurprisingly the case for the well-equipped ST5 music streamer.

Indeed, the ST5 is furnished with everything a modern network audio streamer needs, including support for Wi-Fi, Chromecast, AirPlay 2 as well as Tidal Connect and Spotify Connect. Through the redesigned Arcam App, you get further access to Amazon Music, Qobuz and global internet radio stations. Roon certification and MQA compatability complete the exhaustive list.

Arcam's impressive Radia range is available now, with the A5, A15 and A25 amps costing $1,495, $1,995 and $2,995 respectively, the CD5 CD player priced at $1,295, and the ST5 streamer going for $1,495.

For more information, contact Advance Audio on (02) 9561 0799 or visit www.advanceaudio.com.au

About the new look, in Arcam's words...

As a storied British audio brand founded in Cambridge, UK, in 1976, Arcam will continue developing for high-end audio aficionados and music creators with a discerning sense of quality. However, the industrial design aesthetic was created to also appeal to a new and younger segment of customers with a more affordable, sleek and attractive design without compromising on advances in audio innovation for future products.

"There is a third core customer where we see an opportunity, and that's younger audio enthusiasts who are ready to elevate their sound systems by making investments in high-end systems but are more budget conscience, or as we say, luxury within reach," says Tim Giblin, Director of Global Marketing, Harman Portfolio Brands. "With an aspirational call to 'Be The Centre Of The Music', we are having our customers identify with a brand that is forward thinking not only in styling, but in the sound innovation that has made Arcam a top brand in luxury audio for nearly fifty years."

The main design feature for the Arcam rebranding is the introduction of Radia Yellow, chosen for its contemporary look, its differentiation in the audio industry and its universal appeal.

"Radia Yellow was chosen and so named for Arcam because it speaks to everyone, everywhere," said Jason Gokavi, Principal Designer at Huemen, Harman International's in-house design firm, who worked with the Harman Luxury Audio product development team in the industrial design of the Radia products. "Music is energy, and we wanted to hint at that energy by infusing the brand with a vibrant yellow that will be used throughout the product design and marketing assets going forward."

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Out with the old

Luxman's new flagship PD-191A turntable replaces the long-running PD-171 series and introduces a new and original tonearm jointly developed with Japanese tonearm maker SEAC.

Two-and-a-half years in the making, that statically balanced tonearm, the LTA-710, is fully adjustable and comes equipped with special bearing technology for enhanced movement sensitivity and reduced tracking errors, with the record player capable of playing at speeds of 33 1/3, 45 and 78RPM. You can install tonearms from other manufacturers — 9-inch and 10-inch models are supported, while 12-inch tonearms can be added via an external arm base, sold separately. Full cartridge adjustments are, naturally, supported too.

The PD-191A also features its own original, high-precision, high-torque DC motor that Luxman says "achieves constant and accurate rotation control under various demands" thanks to its sine wave PWM/PID speed control programming, in addition to a reference clock using a MEMS oscillator for speed correction. The new motor is designed to work alongside high-mass platters and at precise speeds while ensuring consistent, smooth sound.

Central to its design, of course, is the PD-191A's 35mm-thick aluminium platter, which weighs in at a rather substantial 5.2kg. The diamond-cut platter has been crafted to deliver "smooth and confident rotation", while also utilising heat and wear-resistant materials such as an engineered plastic thrust bearing for supporting the platter itself.

The rather attractive chassis, meanwhile, is constructed from rosewood-stained natural wood, treated with a glossy finish that contrasts with the heavy metallic shine of the aluminium platter. By offsetting the mounting of the motor inside the lower chassis, the PD-191A's centre of gravity is 12mm lower than that of the previous PD-171A. If you want to keep your turntable clean and tidy, a 4mm-thick acrylic dust cover is sold separately.

The Luxman PD-191A turntable is available now for the princely sum of $18,500, which includes the headshell and tonearm. You can attach your cartridge of choice, though naturally Luxman points you to its $3,299 LMC-5 moving-coil cartridge as a suitable match.

The high-end turntable space isn't getting any narrower, but with premium components and a precision-engineered design, the Luxman PD-191A should feel confident of competing with the biggest players around that price.

For more information, contact Audio Active on (03) 9699 8900 or visit www.audioactive.com.au

Lumina Collection grows

Sonus Faber has had a busy year, bolstering its Homage Collection, introducing its first-ever streaming stereo speakers, and entering the outdoor speaker market. And yet it has managed to sneak yet another launch into the calendar year — this time to delight fans of the Italian brand who cannot quite stretch to the heights of its high-end loudspeaker designs.

Indeed, Sonus Faber is bolstering its entry-level Lumina speaker series with two new models: the Lumina II Amator bookshelves ($2,995) and Lumina V Amator floorstanders ($6,995). While the new models continue the line's simple, minimalist design philosophy, there are a few touches of swanky Italian flair as well as some key technical upgrades to help them stand out from the rest.

Both speakers are constructed from natural materials, including all-new wood front panels alongside a glossy veneer finish in, as you can see, a choice of three colours — red, wenge and walnut. Both, too, share much of the same DNA as their cousins in the Sonus Faber catalogue, including the same damped tweeters from the Lumina and Sonetto series. Each drive unit is also equipped with the company's proprietary natural fibre and paper blend air-dried diaphragm.

But there is novel engineering on display too, with the Lumina II Amator and Lumina V Amator boasting improvements in the components of their crossover networks to deliver what Sonus Faber promises is "breathtaking performance" from almost any position in a given room. Many of these innovations have trickled down from existing lines like the Amati and Homage collections, such as the dedicated circuitry and filter designs in the name of "greater resolution and more rigorous and coherent reproduction".

While the two new models share many of the same characteristics, there are key differences in terms of form and functionality. Each Lumina II Amator features a 29mm tweeter and 15cm paper cone mid/bass, whereas the V Amator floorstanders sport a vented box design and house a 29mm tweeter paired with a 15cm midrange unit and two 16.5cm woofers.

The Lumina II Amator and Lumina V Amator are expected to arrive in the New Year.

For more information, contact Synergy Audio Visual on (03) 9459 7474 or visit www.synergyaudio.com

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CD-changer comeback?

Yamaha has launched a five-disc CD changer called the CD-C603 that not only sports a sound-first feature from the company's amplifiers but also a CD-switching feature I wish I'd had back in 2005.

You don't see many CD changers launching nowadays, with the 90s and early noughties very much the heyday for the multi-disc player following their introduction in the car in the mid-80s. Perhaps you remember the 10-CD (!) Sony DiscJockey.

Yamaha's new multi-disc machine may accommodate 'only' half that many discs at one time, but it has a neat feature called Play X Change that allows you to change discs while another is playing. I wish my early-2000s standing CD tower from Argos (a poor man's Bang & Olufsen BeoSound 9000, and similar to those you'd see in supermarkets that allowed you to 'try before you buy' new album releases) offered such convenience, instead of very slowly grinding the spinning disc to a halt whenever the window cover was opened. Perhaps more sophisticated tower designs (like the B&O) could, but the functionality seems pretty attractive within a 'normal' CD changer format. The disc tray opens fully, facilitating changing five discs at the same time.

The new CD-C603 also boasts a familiar feature called Pure Direct, as seen almost as standard on Yamaha amplifiers and receivers of recent years. This shuts down the digital audio output and turns off the display, reducing the noise interference they inherently cause. Yamaha is promising "sound full of dynamics and clarity" here, thanks to upgrades in the internal layout from previous designs which it says have targeted performance improvements.

Also flying the flag for performance are two design elements found in single-disc Yamaha players today. The first is the 'Laser Pickup Floating Mechanism', which is pretty much what it says on the tin: the laser pickup is isolated on a floating mechanism so that its delicate operation isn't as affected by vibrations. The second is the 'Intelligent Digital Servo', which is essentially digital processing designed to detect and compensate for any signal, tracking or motor speed issues.

In addition to the playback of CD, CD-R and CD-RW discs, the CD-C603 also accommodates WAV and FLAC audio files up to 24-bit/96kHz through its front-panel USB input.

Sure, multi-disc CD players have always been more complicated to make than the traditional, persevering single-disc alternative, and likely more prone to wear and breakage because of that, but if CDs ever do enjoy any sort of serious resurgence, surely they would make sense as the player to appeal to the convenience of the day – no switching discs every hour, just hours of music teed up. Almost like a playlist, without the shuffle.

Want a multi-disc changer in your life in anticipation (or regardless) of a CD comeback? The Yamaha CD-C603 costs $899 and is available in black or silver.

For more information, call Yamaha Australia on 1800 805 413 or visit www.au.yamaha.com

Wireless masterclass

Well, Bowers & Wilkins' latest wireless noise-cancelling headphones certainly seem to have at least one thing over the class-leading Sony WH-1000XM5: stylishness. But a sleek exterior similar to that of their predecessors (albeit now available in a rather fetching 'Forest Green') isn't the only area in which the all-new B&W Px7 S2e headphones promise to stand out.

Bowers claims that its latest Bluetooth headphones boast "significant advances in overall sound quality" compared to the outgoing Px7 S2, a key contributor to that progression being "extensively upgraded DSP". Improved processing has supposedly allowed the British brand to retune the acoustic platform, which is once again built around custom, slightly angled 40mm drivers.

I was very fond of the five-star Px7 S2's sophisticated, neutral and detailed sound, but did find them to be lacking in spaciousness and energy compared to the aforementioned Sonys. So do the new Px7 S2e have what it takes to steal the crown from, and end the long-reigning dynasty of, the Sony WH-1000XM range? They certainly come very, very close, with a more sophisticated sound but also a higher price ($599). Having already gone twelve rounds with them, I find them tremendously detailed, with that detail presented in a full, lush presentation that isn't short of verve. "With class-leading insight and a more compelling balance over their forebears, not to mention a fine sense of style, the Px7 S2e are a wonderfully complete package," I concluded.

Aside from very much sounding – and, in their blue, green, grey or black finishes, looking – the part, the headphones impress in the feature department too. There's support for one of the higher-quality Bluetooth codecs around, Qualcomm's aptX Adaptive, as well as USB-C and 3.5mm cable connections. Battery life is a commendable 30 hours, though arguably even more impressive is their ability to offer seven hours of playback from a mere 15-minute charge.

The active noise cancellation system sees six microphones working together to cancel unwanted noise for music listening and voice calling – two measure the output of each driver, two react to the unwanted ambient noise detected, and two have the job of delivering voice clarity for calls.

Completing the user experience is the Bowers & Wilkins Music App, offering EQ adjustment, ANC mode switching and direct access to music streaming services including Deezer, Qobuz, Tidal and TuneIn, with more to be "added soon".

For more information, contact Masimo Australia on 1300 627466 or visit www.bowerswilkins.com/en-au

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"More accessible" M9s

Ultra-high-end Californian audio brand Magico has announced its latest floorstanders, and you might want to sit down before you read how much they cost.

(Ready?) Retailing at $750,000, the new M7 expand Magico's reputation for super-pricey kit made from super-premium materials. Let's not forget that 2020's flagship M9 launched at $1,500,000 per pair. Imagine having those in your front room!

Speaking of the M9, the M7 take much of their heritage and design DNA from those flagship performers. Indeed, they were conceived to be, according to the company, "a more accessible version of the M9". Clearly, accessibility is a relative term to Magico!

The M7's 164cm-tall enclosures weigh nearly a quarter of a tonne each and are made with a carbon fibre shell, designed to greatly minimise diffraction and negligible internal resonances for reduced damping. Their bespoke support system provides a stable footprint to massively reduce noise and give "perfect" coupling to the floor, too.

With aerospace levels of engineering involved, Magico says the design and performance involved make the M7 the "loudspeaker equivalent of a championship-winning F1 car".

The new model's heritage, though, is truly reflected in its innards. The M7's drivers are designed to eliminate distortion, with the 28mm diamond-coated tweeter (the same as the M9's) optimised for reduced distortion, greater power handling and "massive dynamic capability". The 12.7cm midrange unit uses an aluminium honeycomb core sandwiched between two layers of graphene-infused carbon fibre for what Magico promises is "the highest-performing 5-inch (12.7cm) midrange ever developed".

There's also a 23cm mid/bass driver with a newly designed basket assembly, alongside a 30.5cm woofer which employs the same honeycomb and graphene arrangement as the midrange unit.

Magico's Elliptical Symmetry Crossover is also here in its most advanced and costliest form. The four-way network employs the finest components from Mundorf (Germany) and Duelund Coherent Audio (Denmark) to integrate the six drive units into a virtual point source to make them sound as united as possible.

For more information, contact Addicted to Audio on (03) 9810 2900 or visit www.addictedtoaudio.com.au

Harman buys Roon

Harman International, owned by Samsung, has added music management platform Roon to its large family of brands, which includes Harman Kardon, AKG, JBL, Revel, Infinity, Lexicon and Mark Levinson.

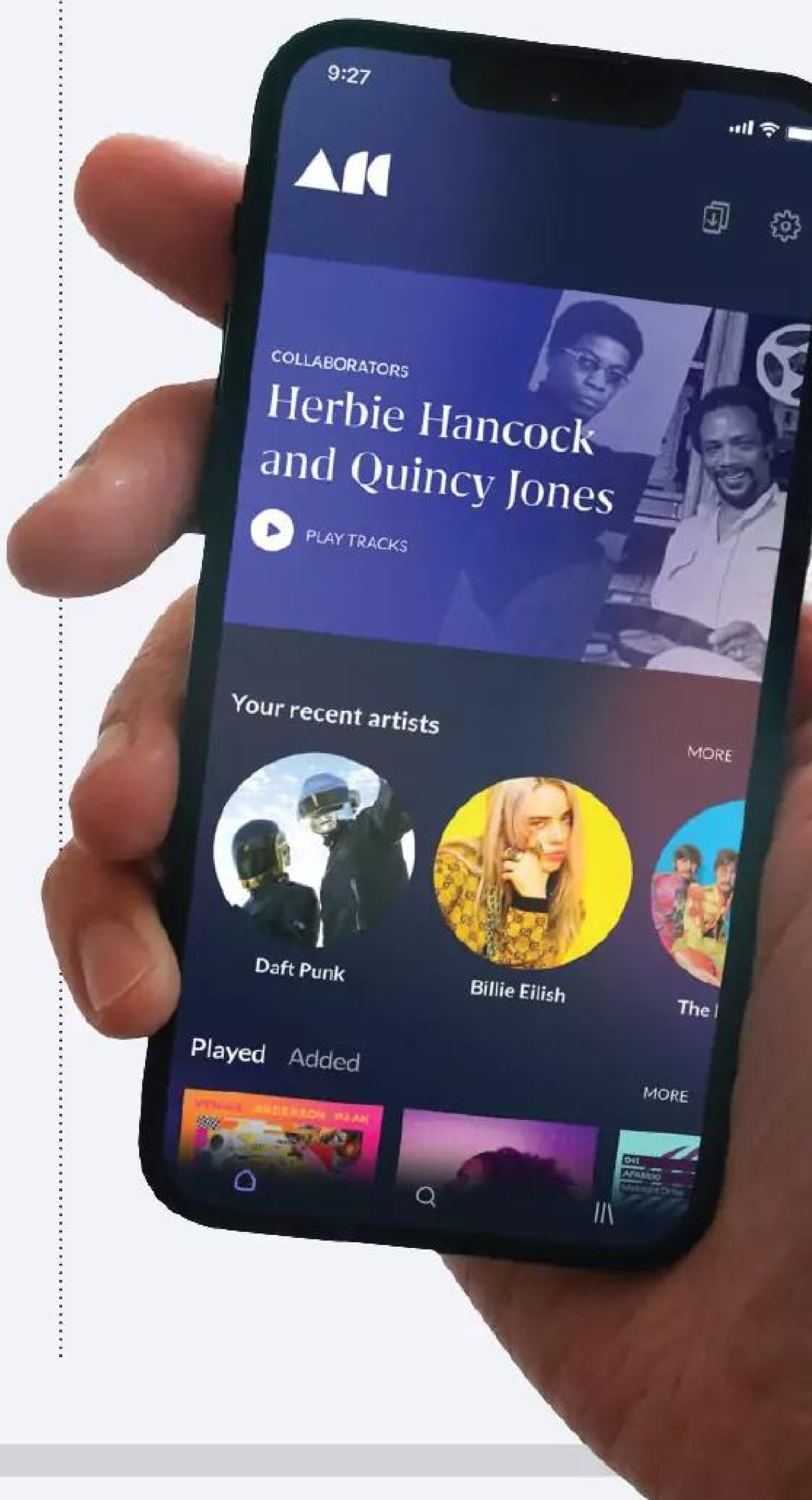
Having begun life in 2015, Roon is a $150/year music library platform that organises all of your streaming services, audio files and internet radio in one place and allows you to send them to hi-fi devices on your network, controlled via the dedicated computer, phone or tablet app. Essentially, Roon is the brain that tells your music what to do and where to do it — the policeman directing the traffic.

The software has been increasingly popular in the hi-fi space, not only with users but also the industry; according to Roon, over 1,000 devices from nearly 200 audio brands are compatible, including most of the big hitters (JBL, Mark Levinson *et al* included!). We certainly find it highly intuitive to use, not only for organisation but also as a curation and discovery tool. Yes, it's pretty pricey — but there is a free trial.

So what does the takeover by Harman International mean for Roon subscribers? Not much right now, it seems. Harman's press release states that 'Roon will operate as a standalone Harman business with its existing team', while in a community forum post, Roon Labs Founder Enno Vandermeer reassured subscribers that "Roon will continue exactly as it is", with memberships and billing processes remaining, and no change to device support (or customer support, for that matter). The community forum site is set to continue, too.

Vandermeer writes: "We're excited because this is the right time to open a new chapter for Roon and the enthusiasts it serves. If you've been reading our posts over the years, you've probably sensed that getting a startup to escape velocity is a struggle. That's because it is; startups with passionate founding teams fail every day. Succeeding as a young company is a constant quest to balance serving the needs of customers with keeping the lights on and bringing on talented people to augment the team. Achieving that balance — particularly without external funding — takes vision, nerves, and a deep reservoir of reckless optimism.

In our new position under the Harman umbrella, we can lean into our vision without the frayed nerves."



CD and streaming matrimony

"One of the most flexible CD players ever created" is how Marantz describes its all-new CD 50n, a silver disc spinner with network streaming integrated — not something I can say I've come across all too often. The versatile source machine arrives alongside the partnering Model 50 integrated amplifier, which features a phono stage to accommodate record players for those who dabble in all three formats.

While fairly novel in concept, the CD 50n ticks a lot of familiar boxes, offering online networked file access via wi-fi or ethernet, and built-in streaming smarts courtesy of the HEOS platform. It supports files up to 32-bit/384 kHz PCM and DSD256. Streaming from mobile is also available via Bluetooth, Spotify Connect and AirPlay 2, while those wanting to incorporate their TV into their two-channel system can play its audio through the CD 50n via HDMI ARC.

Its sonic claims appear impressive too. The CD 50n is kitted out with an internal ESS Sabre DAC combined with Marantz's own custom musical digital filters for what the company asserts provides "a clear and detailed sound with all forms of digital audio".

Unsurprisingly, the new Model 50 integrated takes much of its inspiration from this year's Model 40n. Marantz says it too strikes "the ideal balance between elegant, contemporary design and the musicality expected from any Marantz amplifier". A 70-watts-per-channel power output offers "exceptional current delivery" thanks to its specially designed output architecture operating alongside a hefty power supply and an internal signal path conceived to reduce the loss of impedance.

The Model 50 also promises extremely low rates of distortion as part of its sonic profile, as well as substantial helpings of transparency and musicality. This, Marantz claims, is achieved in part due to the amp's HDAM (Hyper Dynamic Amplifier Module) technology.

The new Marantz CD 50n network CD player and Model 50 integrated amplifier are priced at $3,200 apiece.

For more information, contact Masimo Australia on 1300 627 466 or visit www.marantz.com

A first in 40 years

Well, I didn't see this one coming. Approaching its 40-year milestone, Cyrus Audio has launched its first-ever turntable. The Cyrus TTP comes with an equally surprising price tag of $8,499, marking high ambitions indeed.

Since 1984, Cyrus has been better known for its range of electronics (the CDi players and 6a and 8a integrated amplifiers, to name but a few), but it has recently been branching out to producing sources, such as its recently announced BluOS-powered music streamers. Cyrus says a turntable "has been an obvious missing part" of its product range.

It's not like Cyrus doesn't have form with the vinyl format. It's been behind a number of celebrated phono stages, including the reference Phono Signature/PSX-R2. So will this new venture be worthy of its existing premium components?

The TTP is a belt-drive design, with its plinth and platter "precision machined" from solid aluminium blocks in the name of stability. The platter is suspended on a hardened steel axle that rotates on an "ultra-precise bearing", while adjustable (and replaceable) feet and a damped chassis also help achieve isolation. It also features electronic speed change (33 1/3 and 45 RPM), with simple buttons on the deck, while playback is manually operated.

The included tonearm is a lightweight design with the mass redistributed throughout so there are "fewer points of resonance" — all to read the vinyl groove more accurately. There won't, however, be a cartridge fitted as standard with the TTP; Cyrus is leaving it up to customers and dealers to fit their own cartridge of choice.

Cyrus hasn't built the turntable on its own, by the way. Nick Clarke, Managing Director at Cyrus Audio, says: "While not known for turntable design, we have partnered with a hugely skilled and vertically integrated German engineering company for the mechanical aspects while applying our skills to the PSU and motor drive to create what we believe is one of the best turntables at this price."

It's with the power supply that Cyrus' expertise naturally comes to the fore. The TTP's DC synchronous motor has a "custom-designed digital control circuit", which the company claims reduces the level of wow and flutter and ensures "exceptional speed stability". And that's not all: at the rear of the TTP you'll find alongside RCA phono connections, in true Cyrus style, a socket for connecting an optional PSX-R2 power supply (sold separately for $1,699). Cyrus says this should deliver an "even more stable, ultra-low noise power supply" for the deck's motor.

For more information, contact Indi Imports on (03) 9416 7037 or visit www.indimports.com

Soundbites

21st-century perspectives

Pro-Ject has taken a whole new perspective with its latest record player, reinventing a deck it released in 1999 with modern components and engineering techniques. The Perspective Final Edition is a fresh take on the 6.9 Perspective turntable that launched the Austrian brand into the high-end space, following the commercial success of its budget-friendly 1 and 2 spinners in the early 90s. I found a review of that old Perspective in the *What Hi-Fi?* magazine archives where it was called "phenomenal value" for its then-£1,000 price tag (which is roughly $4,000 in today's money).

The new Perspective will be looking to repeat the success of its ancestor, though it will only have a limited release of 400 units.

If you were wondering what the 'Final Edition' naming was all about, that refers to an all-new line of Pro-Ject turntables that "pays homage to its illustrious past", of which this Perspective is the first. These Final Edition releases 'are just that — final, signalling the touchdown of a model's manufacturing arc', notes the official press release.

While the Pro-Ject 1 and 2's build centred on rigidity, with a solid plinth and heavy platter, the old Perspective was born out of the isolated principle, with a tonearm and platter on a sub-chassis spring, isolated from the main chassis. The new Perspective Final Edition uses its forebear's design blueprint — including that transparent base, of course — but furthers its stability, with a decoupled sub-chassis and three adjustable springs to prevent unwanted vibrations from transferring to the needle. Height-adjustable aluminium spikes offer further isolation.

Another advancement is the inclusion of an electronic speed-switch-controlled, two-speed motor, replacing the multi-motor solution that allowed vinyl to spin at different tempos if the owner so wished. Naturally, there is a new cartridge at the end of the nine-inch, carbon fibre tonearm, too, namely the Ortofon 2M Bronze (which itself has a retail value of $629).

A dust cover and personalised certificate of ownership complete the limited-edition Perspective package, which goes on sale this month for $XXXXX. A serial-numbered plaque can be requested, too.

For more information, contact Interdyn on (03) 9426 3600 or visit www.interdyn.com.au

Heavenly headphones (for a sky-high price)

Known for its beautifully crafted high-end headphones, Romanian brand Meze Audio has just released a sequel to its flagship planar magnetic over-ears that it says offers no less than a "gateway to sonic paradise".

The new Empyrean II continue to use the Isodynamic Hybrid Array driver design from Ukranian company Rinaro Isodynamics but deliver a claimed step-up in performance over the original Empyrean. The goal was to "enhance the headphones' ability to reproduce fine details and achieve a more neutral sound signature, all the while preserving the original 'easy to listen to' character," says Meze Audio's Managing Director, Mircea Fanatan. Responsiveness, accuracy and reliability are three areas in which the company has also endeavoured to make notable improvements.

The headphones themselves don't buck the aesthetic trend — they're gorgeous, with a matte black finish complemented by silver accents, complete with a redesigned grill pattern from the originals. I've encountered the original Empyrean, as well as the company's budget 99 Classics, and can attest to how well-made and luxurious Meze Audio headphones look and feel in the flesh.

The brand also aims to ensure the Empyrean II last for many years to come — every part of their chassis can be disassembled and serviced.

With reduced driver weight and an ergonomic build structure designed to adapt to the wearer's head over time, the cans should be comfortable for long listening sessions, despite weighing 385g (and that's without earpads!).

Meze Audio now offers two sets of earpads with the Empyrean model, too. The new Duo earpads are a mix of premium leather and Alcantara (a synthetic suede-like texture) and aim to deliver "a harmonious tonal balance that resonates across all music genres", along with good bass weight and spacious, refined sound.

The Angled earpads are made from soft foam and Alcantara and feature a protective grille mesh that purportedly focuses on revealing "intricate details and nuances in your recordings". The angled shape is designed to offer more space around your ears, too.

The Meze Audio Empyrean II headphones are priced at $5,499, so sonic expectations should rightfully be high. They certainly come with the accessories that such a price point demands: a hard-shell carry case, and your choice of cables (silver or copper) and connector (3.5mm, 6.3mm, 2.5mm, 4.4mm or 4-pin XLR). You can, however, buy the cables and connectors separately if you would prefer multiple options to play with.

For more information, contact Radiance Audio Visual at (02) 9659 1117 or visit www.radianceav.com.au

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The modern radiogram

It's been 10 years since Ruark Audio unveiled the R7, its modern-day take on the iconic radiogram. It elicited 'oohs' and 'aahs' back then, as did (albeit at a slightly quieter volume) the R7 mk2 sequel, which added wireless streaming to the 2.1 all-in-one system that rather uniquely doubled as beautiful retro furniture. Pretty decent-sounding retro furniture, at that.

So here comes the new Ruark R810, the flagship model in the company's new 100 Series of neat music systems. The R810 echoes many of the new design touches seen in the series' tabletop R410, from the exquisitely handcrafted wood elements in the cabinet and slatted grille (sustainably sourced, spliced and reconstituted for consistent grain patterns) to the four-inch TFT colour display screen on the front. There's also the refreshed RotoDial controller on top of the unit and a separate rechargeable remote in the shape of that distinctive on-unit dial.

The R810 also boasts many of the same features as the R410, from wireless streaming technologies such as AirPlay 2, Chromecast, Spotify Connect, Tidal Connect, aptX Bluetooth and UPnP, to physical connections including HDMI eARC, optical, RCA phono and USB-C. Radio is represented in FM, DAB/DAB+ and internet radio flavours, while hi-res audio support goes up to 32-bit/384kHz.

Indeed, not only are there plenty of ways to stream music from your phone from any music app, but you can also use the R810 with your TV, and even plug in a CD player or turntable.

But it would be unkind to call the R810 simply a larger R410 on tall, polished chrome legs, as there's much more brewing under the surface.

Under the hood is where the core difference lies. Where the R410 has 120 watts of Class D amplification powering two 20mm tweeters and two 10cm mid/bass drivers, the flagship R810 ups the stakes to 180 watts of Class A/B power. It's a 4.1 system, too, featuring two 3cm silk dome tweeters, two 10cm paper cone mid/bass units and a 20cm long-throw paper cone subwoofer. The addition of the integrated active subwoofer aims to deliver music with "accuracy and authority".

(If you're curious: the original R7 had 160 watts of Class A/B power feeding two 14cm dual concentric drivers, one tweeter and a 20cm woofer. It had an integrated CD player too.)

"The inspiration for our original R7 and now R810 came from the beautiful Radiogram that my grandmother had in her home," said Alan O'Rourke, Managing Director of Ruark. "As a kid when we visited, I would spend hours listening to radio stations, playing records and dancing. R810 is our most technically advanced product to date, but a loving homage to those radio-grams of yesteryear."

The Ruark R810 is the natural evolution of the R7, so here's to hoping it can live up to its strong audio heritage and not-insignificant asking price of $6,000. The R810 reaches Australia this month and is available in a soft grey lacquer or a 'fused' walnut wood veneer.

For more information, contact Synergy Audio Visual on (03) 9459 7474 or visit www.synergyaudio.com

Here comes another!

Oh look, another streaming amplifier to join the increasingly large section of the modern hi-fi market hell-bent on marrying high performance with high convenience (... and that's not a complaint!) Rotel has indeed joined the party with an amplified box of tricks — one that looks like it would be just as comfortable boosting TV audio for shows and movies as it would be in a dedicated music system.

The RAS-5000 is a high-power integrated packed with plenty of streaming skills, allowing it to play high-resolution formats via a range of streaming methods, such as Spotify Connect, Tidal, AirPlay 2 and Chromecast. It also supports aptX HD Bluetooth for your offline convenience.

Specifically, the Rotel supports both PCM (up to 24-bit/192kHz) and MQA audio files and is said to render these with precision thanks to its bespoke digital section, which is centered around an ESS DAC.

As well as wireless connectivity, the RAS-5000 supports a range of wired connections — HDMI ARC allows audio to be passed through your TV to the amp and into any connected speakers, while a PC-USB input sits alongside traditional source inputs such as coaxial, optical and RCA.

The streaming amplifier also features a large colour display, which is always welcome on such machines for showing track names and artwork during playback.

The RAS-5000 uses an oversized toroidal transformer, delivering a consistent rated 220 watts of Class A/B power into four ohms. The overall design is said to deliver ultra-low noise power and deep, controlled bass.

Rotel's debut streaming amplifier will be available in either black or silver finishes and is set to cost $4,399.

For more information, contact Interdyn on (03) 9426 3600 or visit www.interdyn.com.au

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Whim or winner?

WiiM has been making waves in the audio industry of late with its critically acclaimed Pro and Pro Plus — rare propositions as high-performing streamers at the very affordable prices of just $219 and $279. They have been a magnet for praise, five-star reviews and awards from several specialist hi-fi and audio outlets, offering those who don't want to spend big money on smartening up their system a decent way to do so.

So were they flukes or is WiiM seriously streaming savvy? Perhaps the answer to that somewhat hangs in the balance of how well its first-ever streaming amp fares. Billed as another budget offering packing plenty of performance, the new WiiM Amp — $500 here in Australia — teases an "impeccable audio experience" in addition to a bevy of features including hi-res audio, multi-room functionality and support for various streaming platforms and services.

Indeed, as a combined streamer and amplifier, this is yet another just-add-speakers system, to which you can connect a pair of speakers directly for a simple, neat, entry-level system. You can stream music directly from the WiiM Amp via Bluetooth 5.0, wi-fi or wired ethernet.

WiiM boasts support for Apple AirPlay 2, Google Chromecast, Spotify Connect and Tidal Connect, and works with Siri, Alexa, and Google voice assistants too. There's also support for DLNA-enabled products, plus a handy WiiM Home App for playback control.

As for physical connections, you have analogue RCA, digital optical and USB inputs, a HDMI ARC TV connection, a subwoofer output and, of course, a pair of speaker terminals.

Unsurprisingly for a product of its size and price, the WiiM Amp sports a Class D amplifier with a modest 60 watts of power per channel (into eight ohms). It packs an ESS Sabre DAC capable of handling hi-res files up to 24-bit/192kHz, and users can adjust the system's onboard EQ options (featuring 24 preset profiles) to tweak their sonic experience accordingly.

The WiIm Amp you get through the post or off the shelf won't be the same at the end as it is at the beginning, either, with WiiM promising that it will improve over time via frequent software updates. Roon Ready certification is "expected soon", for example.

For more information, contact Fundamental Audio on (03) 9999 7716 or visit www.funaudio.com.au

An ode to Roman roots

It's an exciting time for Acoustic Energy, who has just launched what it claims is its most significant loudspeakers to date.

The Corinium have been designed to be optimal mid-sized floorstanders, with their mid- and high-frequency drivers positioned at ear height and working with a dual-subwoofer section further down the cabinet. Acoustic Energy says this configuration brings a blend of what both standmount and floorstanding loudspeakers excel at — providing great dynamics and expression while driving larger spaces than a traditional floorstander is capable of.

Based in Cirencester in the UK's Cotswolds region since 1995, Acoustic Energy wanted to pay respect to the town's Roman history. It was once the most important town in England outside London and was called 'Corinium', hence the name bestowed upon the company's newest creations.

These new units are fairly sizable speakers, which somewhat helps them score highly on the perceived value scale. Each weighing 40kg and standing tall at 110cm, the cabinets have a four-degree tilt to improve the time alignment of audio for the listener. The enclosures are made from a 'Resonance Suppression Composite' with a thickness of up to 4.5cm. This, along with the 6mm-thick 'ultra-rigid' aluminium baffle, is said to keep the drivers secure and isolated from cabinet resonance.

Speaking of drivers, the Corinium's 29mm tweeter is made from a new soft-dome material, while the 12cm midrange unit and twin 14cm bass drivers sport carbon fibre cones.

Acoustic Energy's Corinium floorstanders cost $11,150 and are due to hit Australian shores shortly in four different cabinet finishes — satin black, satin white, 'Teak Tectona' or, attracting a $1,445 premium, 'British Racing Green'.

For more information, contact M&G Hoskins at (02) 9597 3683 or visit www.mghoskins.com.au

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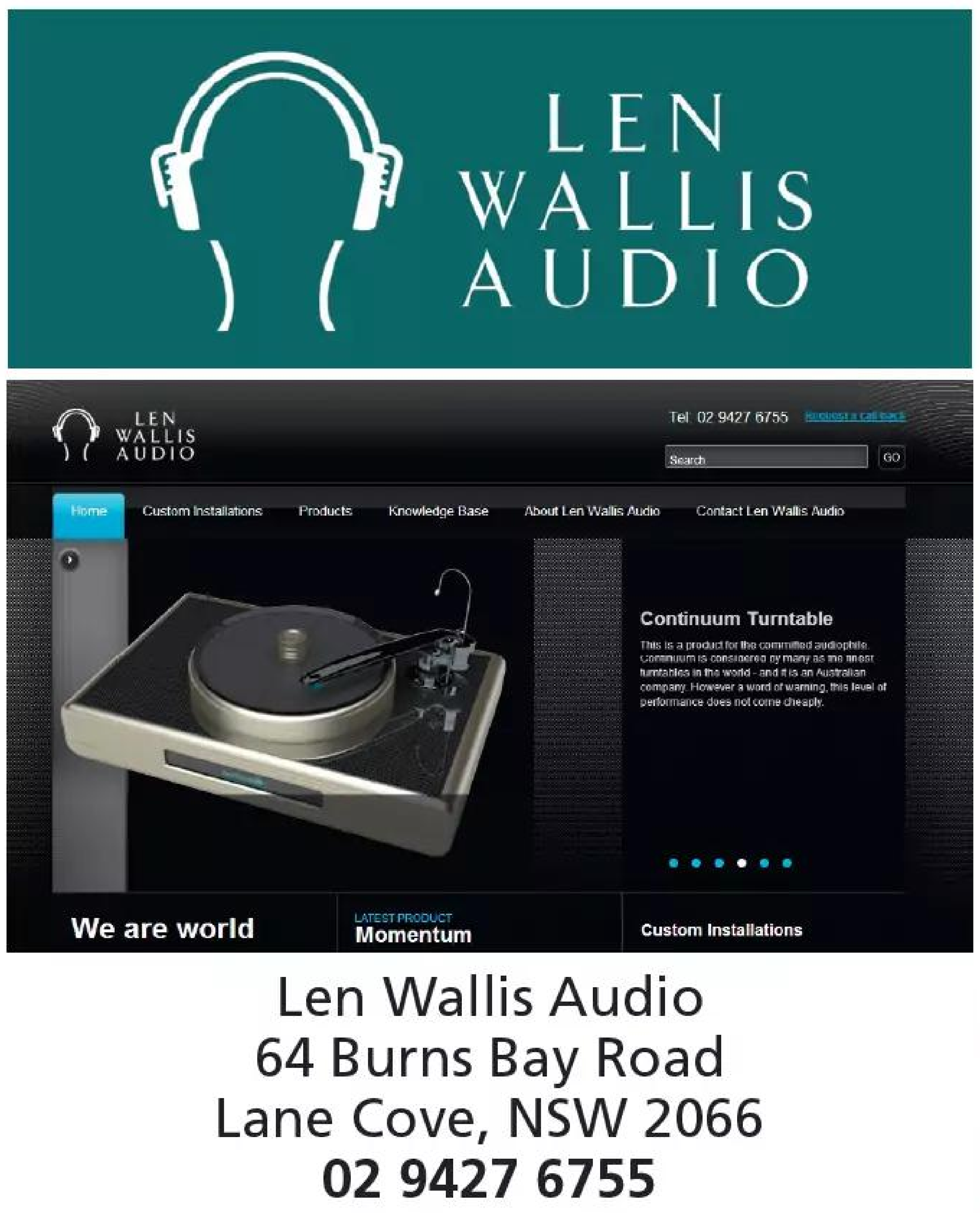

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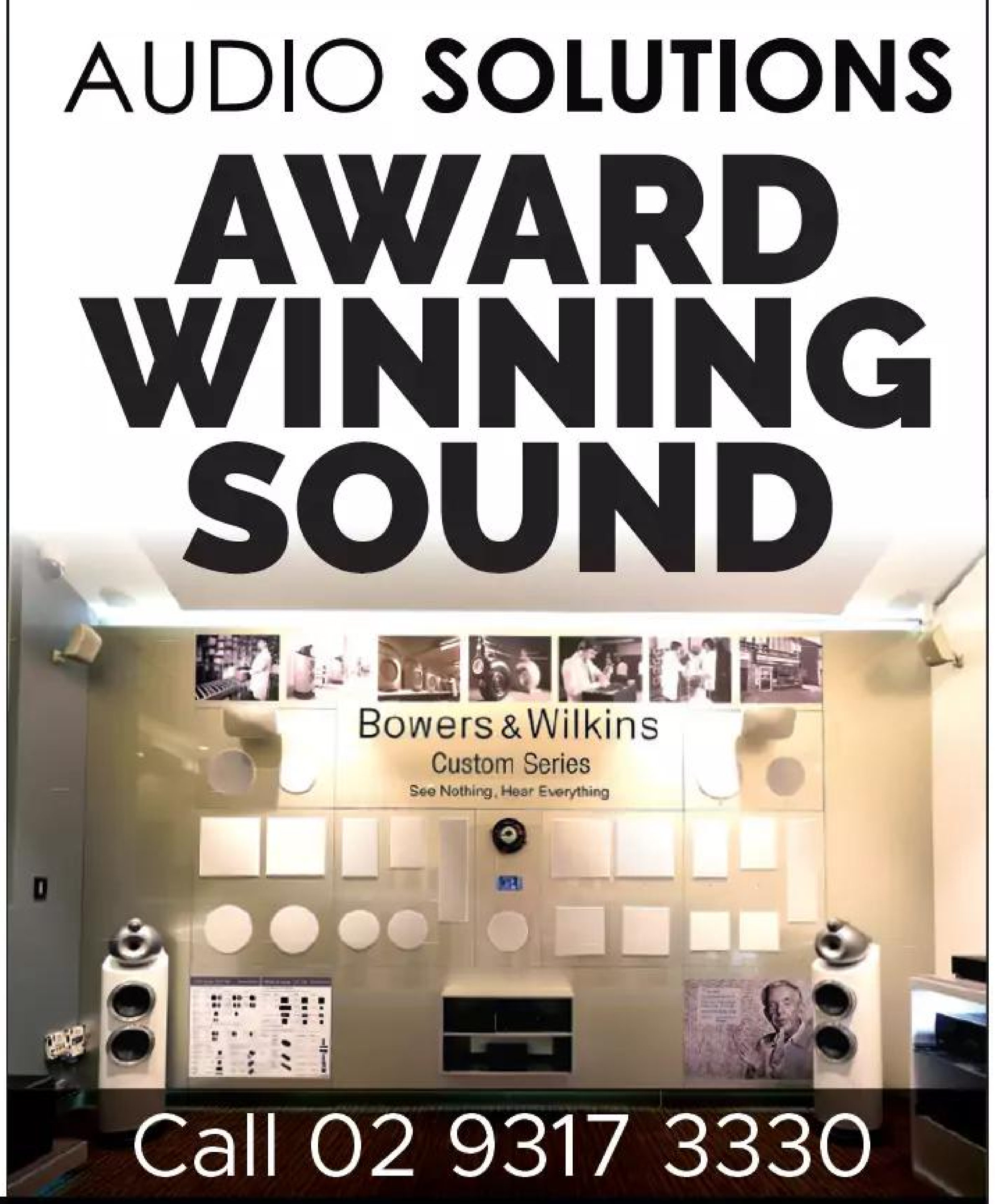

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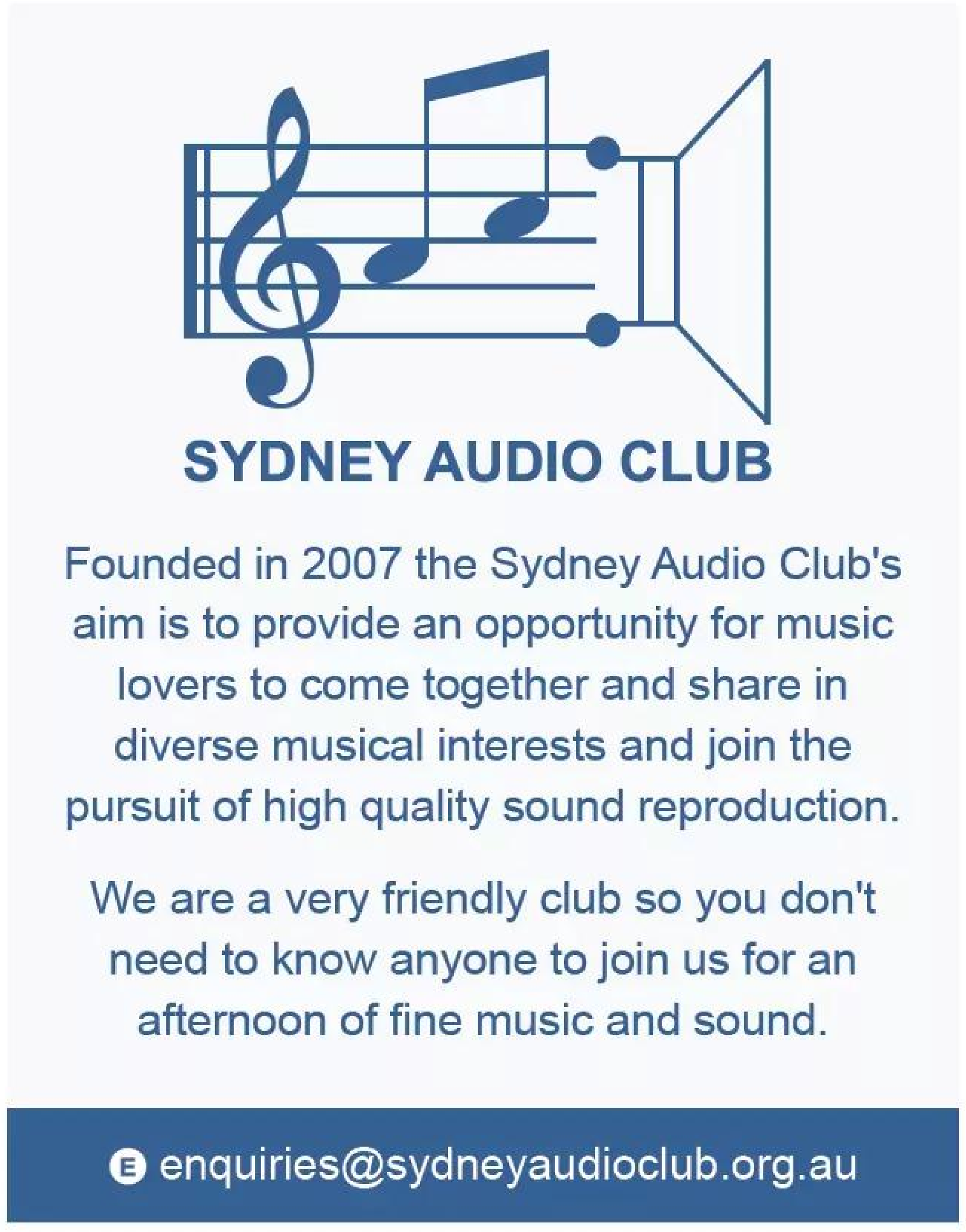

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TAGA Harmony TCD-50

CD Player

- Solid build quality
- Excellent sound quality
- Balanced outputs

- 'Only' a VFD display
- No display dimming option
- Glitchy controls

RRP **$995**

Don't be overly concerned if you have not previously heard of TAGA Harmony or seen its distinctive but disturbing wave-like logo. The company only came into being in the 90s, only recently began building CD players, and only last year introduced that logo. To the best of my knowledge, the brand's products have never previously been available for sale in Australia, either (and are still not for sale in many countries, with TAGA Harmony seemingly bent on concentrating its sales efforts in Europe).

The company takes its name from the initial letters of its motto, which is 'To Achieve Glorious Acoustics', and was founded in Poland in the early 90s by P. Kokocinski and K. Richard (the TAGA Harmony website reveals only their initials). The site also states that the two men are music lovers and specialists in the high-end audio business who "realized that most speaker brands which claimed their products had top sound performance, offered them at extremely high prices but they did not really provide good sound quality for the money". And this is what "prompted them to establish their own TAGA Harmony brand".

The first product developed by the founders was a pair of loudspeakers, but the company says that it now offers "high-end hi-fi and home theatre speakers, in-wall and in-ceiling and outdoor speakers, multimedia speakers, hi-fi electronics, audio cables and accessories and audio equipment for the professional audio market". When I checked out what was available from TAGA Harmony in the way of hi-fi electronics, I found that the company's Australian distributor, Audacity, listed five integrated amplifiers and a CD/DAB+ receiver that were all hybrid designs, with valve preamplifier sections and solid-state output stages, a phono preamplifier and wireless streaming adaptor. And then there was the TCD-50 CD player in black or silver finishes. These products are all built in the People's Republic of China (or, as it's identified on the rear panel of the TCD-50, 'P.R.C.').

You will likely be surprised when you first pick up the TCD-50… it's much more rigid and solid than most

THE EQUIPMENT

That TAGA Harmony should have a CD player in its line-up today, at a time when many pundits are claiming that the days of the compact disc format are long gone, is not really surprising. Given their background in the retail industry, Kokocinski and Richard no doubt realised that the market for budget-priced standalone CD players is now a niche one: most of the manufacturers previously building them have ceased production

entirely. The only two companies I can, off the top of my head, think of that are still building budget standalone CD players are Yamaha and Rotel.

The duo also realised that most consumers like being able to operate their CD players without a remote control, so the TCD-50 has a full set of front-panel transport controls located on the right of the centrally positioned CD tray and front-panel display, as you can see from the images accompanying this review. The buttons are absent of any description, but I guess most people nowadays would recognise the so-called 'universal' icons that sit above them.

Notwithstanding that sentiment, it's probably better that TAGA Harmony minimised the use of lettering on the front panel, considering that what *is* there is rather small and screen-printed in a light grey colour that doesn't really contrast with either of the two available front-panel finishes and so is difficult to read. It appears that TAGA Harmony didn't want to use different colour printing on the different models (likely for cost reasons), so it has chosen one that isn't really the best choice for either!

The three buttons in the top row of transport controls are for (from left to right) disc tray open/close, play/pause and stop. The two in the bottom row are for track-skip/fast-reverse and track-skip/fast-forward. These transport controls are duplicated on the infrared remote control supplied with the TCD-50, about which more later.

To the left of the CD drawer and display are a mains power push-button, 3.5mm headphone jack, and a rotary volume control that affects only the volume at the headphone jack (the line-level output volume is fixed). I would much rather TAGA Harmony had fit a standard, full-sized 6.35mm headphone jack — mechanically speaking it is far more robust, and it also offers superior electrical conductivity than the smaller phone jack type due to the twin virtues of superior physical tolerances and greater surface contact area. It's not like there wasn't enough room on the front panel to include one!

TAGA Harmony would likely argue that more people own 3.5mm-ended headphones than pairs with 6.35mm jacks, and I would be the first to agree. But I also believe that most headphones specifically designed for home (rather than portable) use are 6.35mm-ended, and those who do have 3.5mm-terminated pairs could very easily use a low-cost 3.5mm–6.35mm adaptor.

If you choose to purchase the silver version of the TCD-50, you will almost instantly discover upon unboxing it that the finish of the CD tray drawer contrasts rather violently with the dark colour of the panel into which it is inset, and through which the VFD display numerals are visible. I personally found the clash so disconcerting that it would rule out the silver finish for me. With the black version, there is no visual clash — the CD tray drawer is also black.

I must admit, I find it odd that TAGA Harmony wouldn't just use the black disc tray on both the silver and the black models, since it already makes it anyway. In my opinion, this would dramatically improve the looks of the silver version.

The front-panel screen was a little disappointing because it's a fairly low-resolution, dot-matrix style vacuum fluorescent display (VFD) whose low-density dots aren't exactly 'sharp' to the eye, no matter whether you're looking at the display up-close or from a distance. I might have expected a slightly higher-quality display from a player whose retail price is just shy of four figures, but I guess that if you're cutting costs on screen printing, you're also not going to spend big on a display. Most current audio electronics components nowadays use either LED, LCD or OLED displays, which in my mind are preferable for their readability.

On the rear of the TAGA Harmony TCD-50 is a satisfying spread of connections. There are both standard unbalanced left and right analogue outputs (gold-plated RCA terminals) and balanced analogue output terminals (XLR), in addition to two standard digital outputs — one coaxial SPDIF (RCA) and one optical (Toslink).

Mains power comes in via a standard three-pin (fused) IEC socket, so you can easily choose a cable colour and length to best suit your application. The one supplied by TAGA Harmony is black and 1.5 metres long.

REMOTE CONTROL

The small, neat and glamorously shaped plastic remote supplied with the TCD-50 doesn't come with batteries, so you'll have to fit your own. That's fine by me because often I advise you to throw away batteries supplied by manufacturers anyway — they're usually of inferior quality and/or are not leakproof… and you really don't want the batteries in your remote control to leak! I'd suggest using Lithium cells (only two AAAs are required, so we're only talking about a few dollars here) or otherwise brand-name, leak-proof alkaline cells.

As noted earlier in this review, the remote has buttons for controlling the disc transport (including drawer open/close) — but it has additional buttons that give access to more of the TCD-50's features. These include direct track access via buttons numbered zero to nine; repeat functions (repeat a single track or all tracks/disc); an A–B repeat mode allowing you to repeat several bars of music over and over (admittedly, only really useful if you are learning a musical instrument or trying to memorise a song lyric); and, lastly, a 'Time' function.

This 'Time' feature (which is incorrectly explained in the otherwise excellent owners' manual) lets you switch the display to show either the elapsed time in the track you're playing (the default display mode) or the remaining time in the track (press the 'Time' button once) or entire CD (press it again). Rather annoyingly, and unlike most CD players, there is no indication as to which display option is currently showing, so you'll have to work this out for yourself. On the bright side, I really don't think that many people actually care about having a switchable time function at all!

You will notice that the remote control does not have a '+10' button, but it's not required — you can access tracks numbered higher than nine by simply pressing two of the number buttons.

The TCD-50 proved it's a player to be reckoned with, sounding superb throughout...

This is the best track access system for remote controls, so I'm pleased TAGA Harmony is using it.

You might also notice the absence of a 'Memory' button on the remote, which is for the simple reason that the TCD-50 is not programmable — you cannot program tracks for playback in an order other than sequentially ascending (i.e. normal CD track order!). And you might clock the two 'spare' (unmarked) buttons on the remote. These don't do anything other than suggest that TAGA Harmony is using an off-the-shelf control made by a specialist remote manufacturer rather than making its own.

Inside the TCD-50 is one of ESS's excellent Sabre DACs, even if that specific chip (the ES9018) is now getting a little long in the tooth: it uses the original version of ESS's unique Hyperstream architecture, whereas the more recent ESS DAC chips use its Hyperstream IV architecture. But while not the most recent ESS DACs, the ES9018 still has a higher DNR (127dB) and lower THD (–120dB) than many of the chip company's more modern designs, which is why it's still a favourite for designers of high-end hi-fi CD players and DACs. Of course, the ES9018 also features ESS's famous Time Domain Jitter Eliminator circuitry onboard to mitigate the effects of digital jitter on the audio signal.

The TCD-50's power supply, meanwhile, sports a very large 35VA multi-tapped toroidal transformer to provide power for the digital and analogue circuits.

I should note, too, that you will likely be surprised when you first pick up the TCD-50, because it's much more rigid and solid than most I've come across, primarily by virtue of being made from heavy-duty steel rather than aluminium. That sees the TAGA Harmony player tip the scales at 5.3kg — though the weight of that hefty toroidal transformer obviously significantly contributes to that. The front panel is not ferrous but anodised aluminium, too.

IN USE AND LISTENING SESSIONS

The TCD-50's loading tray moves quickly, smoothly and silently on both its inward and outward journeys, while CD playback starts very quickly with almost all discs. I've included the 'almost all' caveat because the player is designed to spin standard commercial compact discs with playing times of less than 74 minutes. This will be the great majority of them, considering the Red Book CD standard states that specific duration as a commercial CD's maximum playing time. However, there are some (not many!) non-standard CDs out there that have longer playing times, and these may not play correctly.

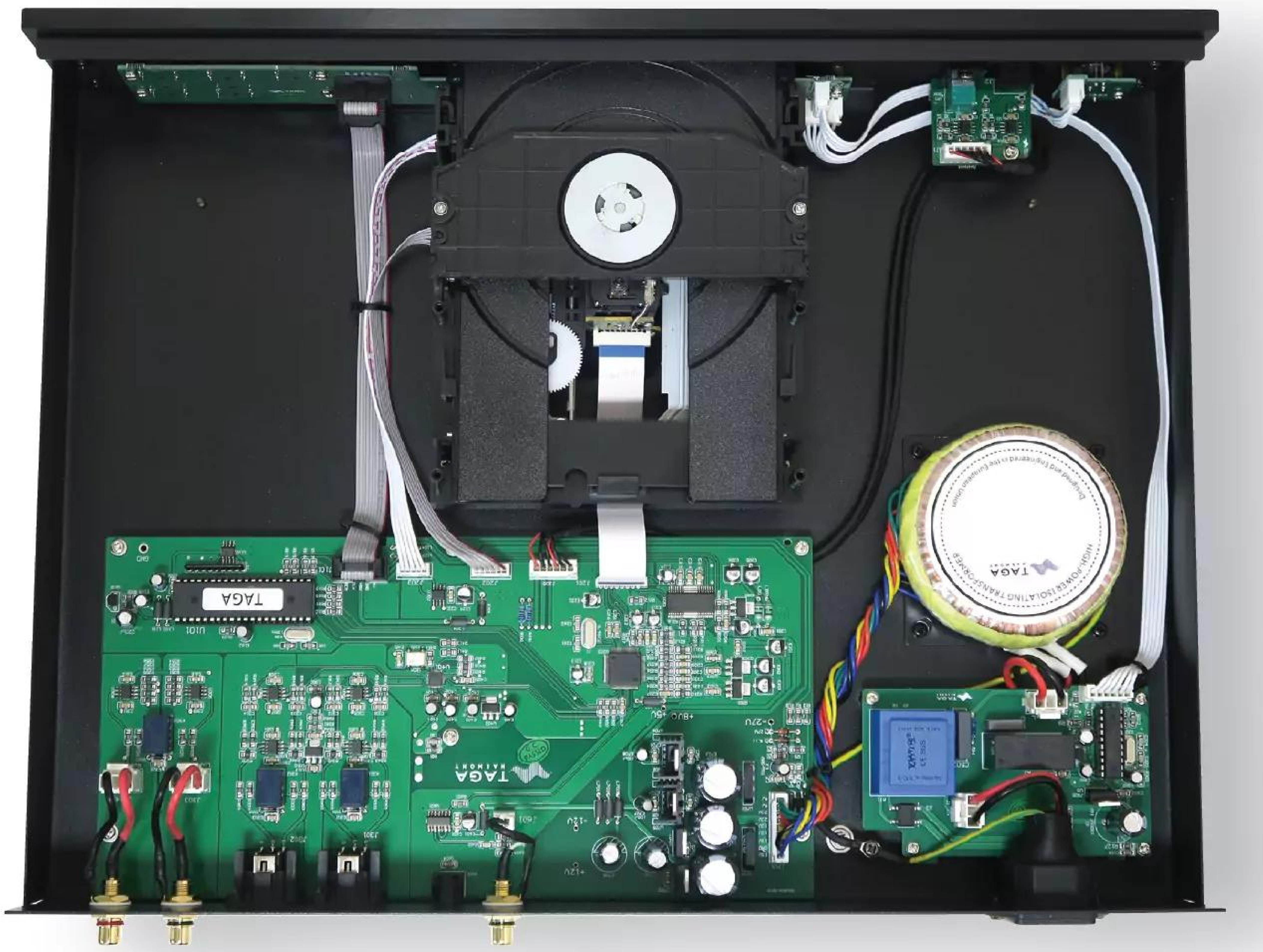
The caveat is also necessary because I found that my TCD-50 review sample occasionally rejected CDs with more than 90 tracks on them — they would fail to play and the display showed 'No Disc'. Opening the drawer and re-loading the disc fixed this on most occasions, though sometimes a few attempts were required.

Finally, any CDs you've recorded yourself on your computer using CD-R or CR-RW discs will need to be finalised on the computer before the TAGA Harmony will play them.

Once a disc was playing, ordinary playback progressed very well and without incident, but sometimes when I tried to fast-forward through a track, the player would stop, after which the display would show the disc's total number of tracks and playing time, while all the transport controls were locked out except for the disc drawer open/close button. Whenever this happened (which wasn't all that often), I would have to reopen and reclose the drawer to reset the player's controls.

I found the operation of the A–B repeat function rather unusual, too. Whenever I pressed the 'A' to set the start point of the A–B loop, the display would freeze so I couldn't see how many seconds had elapsed since I pressed it. Then, when I pressed the 'B' button to set the loop's stop point, the display remained frozen while the player correctly played the loop as programmed.

This lack of functionality is strange in itself — most displays show elapsed time during this mode, so that if 'A' was set at 8:10 and 'B' at 8:20, the display would show 8:10, 8:11, 8:12 etc up to 8:20, then switch back to 8:10. But what



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complicated the process further was that when I exited the A–B loop, the music played back OK but the display remained frozen — I'd have to restart the track to unfreeze it. Given that the A–B mode worked fine in terms of playing the selected section of music over and over, and that so few owners will use it anyway, it's hard to mark the TCD-50 down for this minor shortcoming. I wasn't going to mention my dislike of the display using a mix of an uppercase 'A' and lowercase 'b' to signify when the player is in this mode, but (as you've now read!) I changed my mind.

I didn't, however, change my mind about the sound quality emanating from the TAGA Harmony TCD-50. My first impressions were that it was pretty damned good, and many, many hours of listening to hundreds of CDs did not change my mind in the slightest — the performance of this machine really is pretty damned good!

I found the TCD-50's bass response to be powerful and extended. It perhaps had a little less of the 'fullness' delivered by some state-of-the-art players, but I certainly found it easy to differentiate between similar-sounding instruments. The pitch control was perfect, too, as was the timing. Listening to Victoria Monét's fabulous album 'Jaguar II', I could hear the solidity of the TAGA Harmony's bass delivery right from the intro track *Smoke,* and again in the following track, *Smoke (Reprise)*. Listen, too, to the lovely stringy-sounding bass on *Mama*, as well as the varying tones of the different horns.

If you want to hear the precision of the TCD-50's pace, rhythm and timing (or PRAT!), I suggest you listen to *Welcome to My Island*, the lead track to Caroline Polachek's excellent album, 'Desire, I Want to Turn into You.' Despite the syncopation being complex and multi-layered, the TAGA Harmony delivered it all to perfection — along with that subterranean bass. The syncopation continues and becomes even more complex on *Pretty in Possible*, plus we get to hear Polachek's incredible vocal range — again, superbly delivered by the player. While you're evaluating these for yourself, also pay attention to how well the TCD-50 reproduces the various added sound effects on the album.

On the same album, *Sunset* demonstrates both the accuracy of the stereo imaging and the degree of channel separation that are within the TCD-50's ambit. The image is perfectly focused stage centre when it's supposed to be, and at the same time you can hear sounds exclusively in the left or right channels, as well as the effect when they trade places.

First impressions were that it was pretty damned good… many hours of listening did not change my mind

Playing the excellently titled *Blood and Butter*, the TCD-50 proved it's a player to be reckoned with, sounding superb throughout, whether it was delivering the authentic tolling bells, the unmistakable sound of the bagpipes, or the all-pervading synthesised effects. Sublime! Perhaps even more sublime is the way the machine delivers Polachek's voice in *Hopedrunk Everasking*, and then there's also the close-out to *Butterfly Net* to enjoy, with its percussive effects and the angelic sound of the Trinity Choir. Indeed there's nothing not to like about any of the album's tracks — it's a *bona fide* masterpiece.

Switching to Eva Cassidy's 'Eva By Heart' album, I was impressed by the authentic naturalness of her guitar, which sounded as good as I've heard it through CD players multiple times the price of the TCD-50. As well as using this disc for guitar sound and female vocal appraisal, I also used it to compare the sound of the keyboard cellos with that of Dan Cassidy's violin, and the TAGA Harmony revealed the sonic differences in no uncertain terms.

I note with some sadness that Cassidy would have celebrated her 60th birthday this year, had she not died tragically young (of cancer, aged 34). Although she became better known and more famous posthumously, her memory star is fading a little now, so I suggest you remember her by buying the compilation 'Best of' album released in 2012. It's packed with fantastic tracks, including *Kathy's Song, Songbird, Ain't No Sunshine, Time After Time, Fields of Gold, True Colours* and *I Know You by Heart*. I guarantee this CD will become a regular on your auditioning schedule — unless you're lucky enough to already own all her albums.

Playback from the TCD-50 was also noise-free, meaning that even the clarity of the musical details at the very lowest recorded levels was exceptionally good. And this manifested itself primarily as an increased transparency to the sound, irrespective of the musical genre. I was quite stunned by the amount of detail and transparency demonstrated on Renée Rapp's debut album, 'Snow Angel'.

I need to preface my praise for this album and its sound quality by acknowledging that it's not so much Rapp's debut album as her first with Alexander Glantz (often known as Alexander 23). In fact, Glantz produced the entire album, co-wrote nearly every song, and played instruments including the acoustic and electric guitar, bass, synthesizer, piano, synclavier, Wurlitzer electric piano, drums and synth bass on some or all of the tracks. He also programmed pretty much all of the drums and sang backup on many of the tracks. Why he wasn't co-credited on the cover is beyond me!

Listen to the lovely piano sound on *I Hate Boston* (the piano here is played by Kim Vi, not Glantz) and you can admire the TCD-50's ability to deliver it so well. Listen also to the strange producing decision about the piano sound that happens 41 seconds into the track — and again, it's easy to admire the TAGA Harmony's capacity to reveal it. This track also reveals that Rapp really *can* sing, which is a little unusual for an actress-turned-singer. Yet again, the TCD-50 has the transparency to show just how good her voice is.

The piano sound on the title track, which this time *is* played by Glantz, reveals not only that it's a different piano than the one Vi plays but also that it could've done with a good tune! Good CD players make such details clearly audible… though sometimes you might prefer a performance that isn't so revealing!

The TAGA Harmony also does a great job on this track's background vocals, supplied by none other than Alyah Scott who, despite being best-known for her role in the series 'The Sex Lives of College Girls' (as Whitney Chase), actually kicked off her career in musical theatre. I guess for her, then, it's more a case of singer-turned-actress-turned-singer-again!

I have to say, I really like that the TCD-50 has a headphone jack because I often listen to CDs using headphones (with those headphones often plugged into CD players that aren't attached to a hi-fi system at all — I always use one of these combos when working on my computer, for example). I particularly liked the TCD-50's provision of a volume control, and that the design of the knob made it super-easy to adjust. So,

except for the size of the socket, as I somewhat knocked earlier, full marks go to TAGA Harmony on this score.

CONCLUSION

There is so much to like about the TAGA Harmony TCD-50 that I am going to forgive the size of the headphone socket, the glitchy transport controls and the fact that the front-panel display can't be turned off or its brightness adjusted. The transport issues I noted are all under software control, so they may well have been rectified by the time you read this review. But if they haven't been, the only one really likely to be a potential bother is the A–B repeat function, and then only for people who regularly use it. If you don't fall into this category, no worries!

Which leaves us with a very solid and very well-built CD player that has both balanced and unbalanced analogue outputs, as well as digital outputs that allow it to be used purely as a CD transport alongside an external DAC. That said, I can't see any reason for wanting to use an external DAC because the quality of the TCD-50's own digital-to-analogue conversion circuitry is excellent. ***Greg Borrowman***

CONTACT INFO
Brand: TAGA Harmony
Model: TCD-50
RRP: $995
Warranty: Two Years
Distributor: Audacity Australia Pty Ltd
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Docklands VIC 3802
T: 03 9642 3887
E: info@audacityaustralia.com.au
W: www.audacityaustralia.com.au

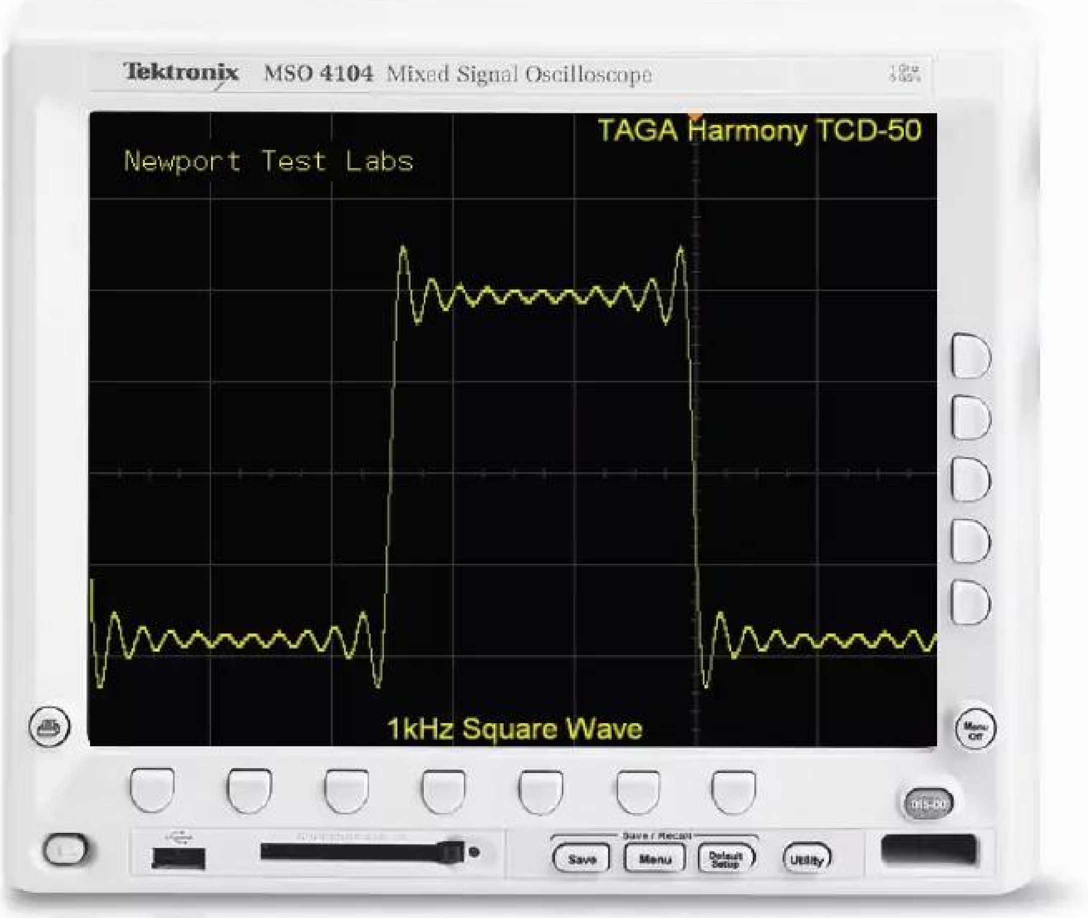
Laboratory Test Report

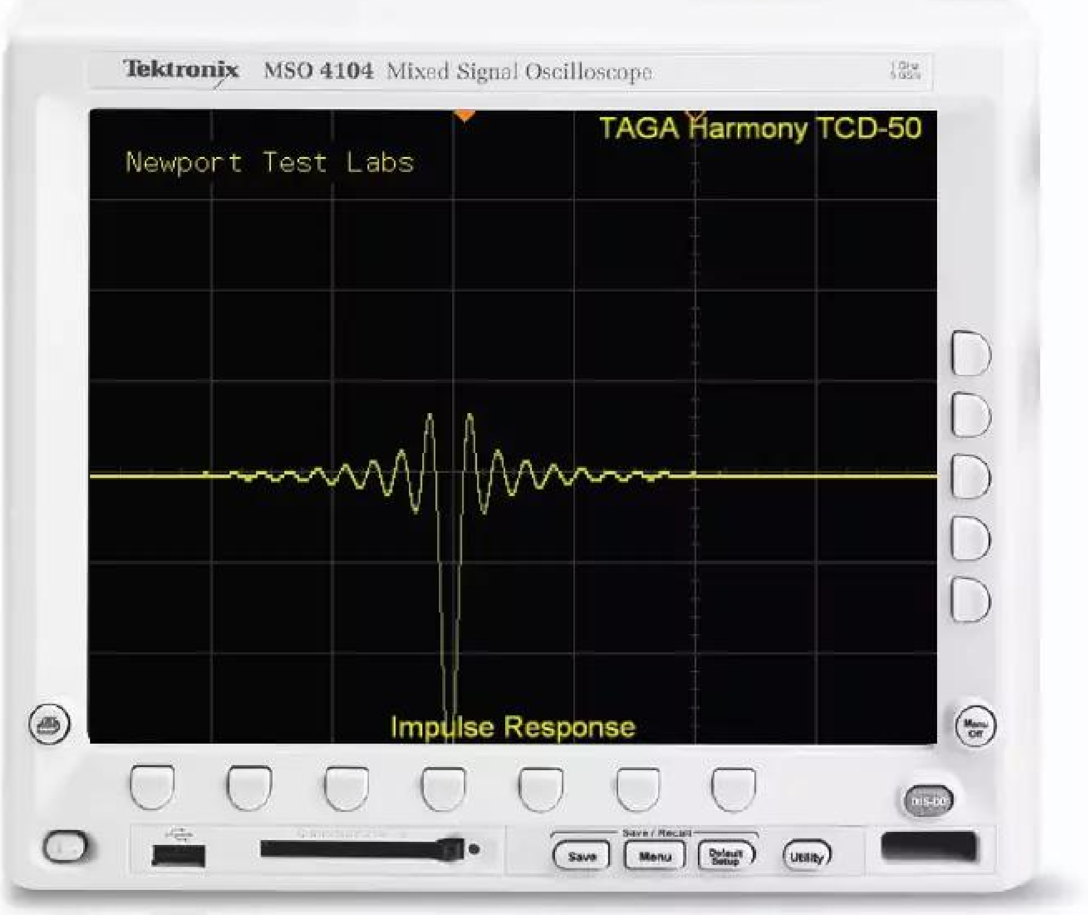
Readers interested in a full technical appraisal of the performance of the TAGA Harmony TCD-50 CD Player should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

The output voltage of the TAGA Harmony TCD-50 was entirely standard, with *Newport Test Labs* measuring it as being a fraction over two volts from the unbalanced outputs and a fraction over four volts from the balanced outputs when playing a 1kHz test signal recorded at 0dB. (You can see the exact value in the Laboratory Test Result table below.)

The balance between the left and right channels was excellent, with *Newport Test Labs* reporting it as 0.011dB. The separation between the two channels was also excellent, with the TAGA Harmony TCD-50 returning results of 139dB at 16Hz, 136dB at 1kHz, and 113dB at 20kHz. The result at 20kHz is exceptionally good — many CD players struggle to get out of double figures at this frequency.

Inter-channel phase accuracy was excellent, with the TAGA Harmony TCD-50 returning phase errors of just 0.02 degrees at 16Hz, 0.03 at 1kHz and 0.64 at 20kHz. Absolute phase, on the other hand, was inverted, as you can see from the oscillogram. This is simply interesting, as it would not be audible, but if you did want to correct this, it is a simple matter of reversing the speaker connections on both speakers so that the positive speaker cables go to the negative speaker terminals, and the negative speaker cables go to the positive speaker terminals. Group delay was typical for an oversampling DAC design.



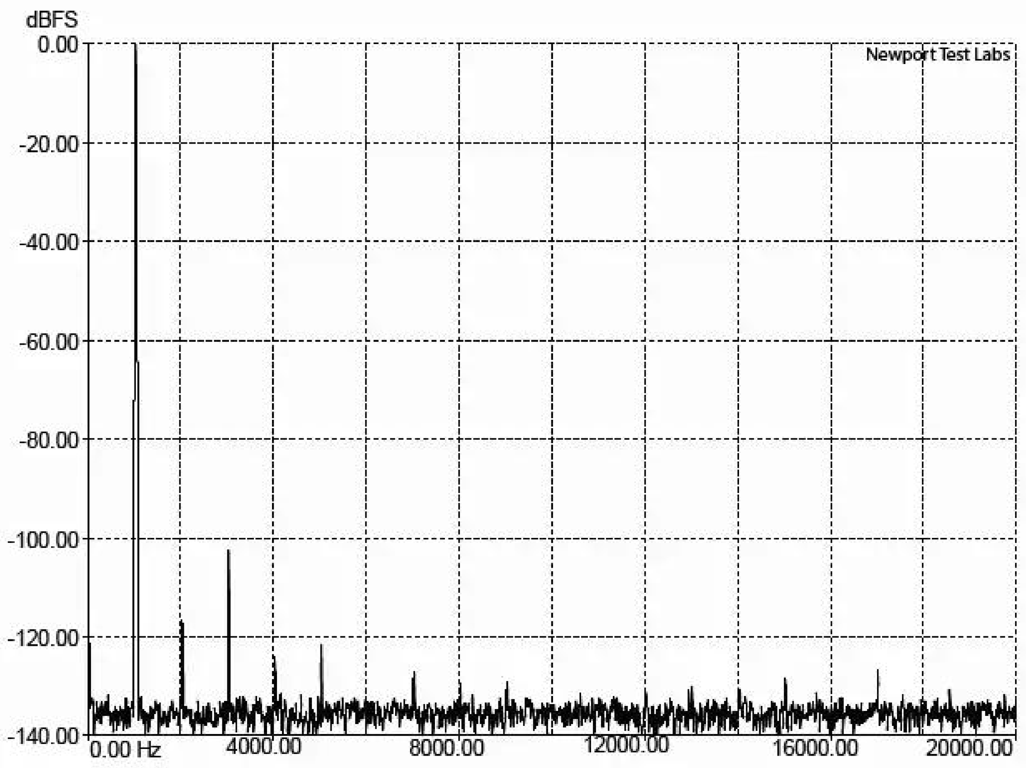


The signal-to-noise ratios measured by *Newport Test Labs* for the TAGA Harmony were a long way from being the highest I've seen from a CD player, but the measured results of 105dB unweighted and 113dB A-weighted mean that most amplifiers will be adding more noise to the audio signal than the TAGA Harmony.

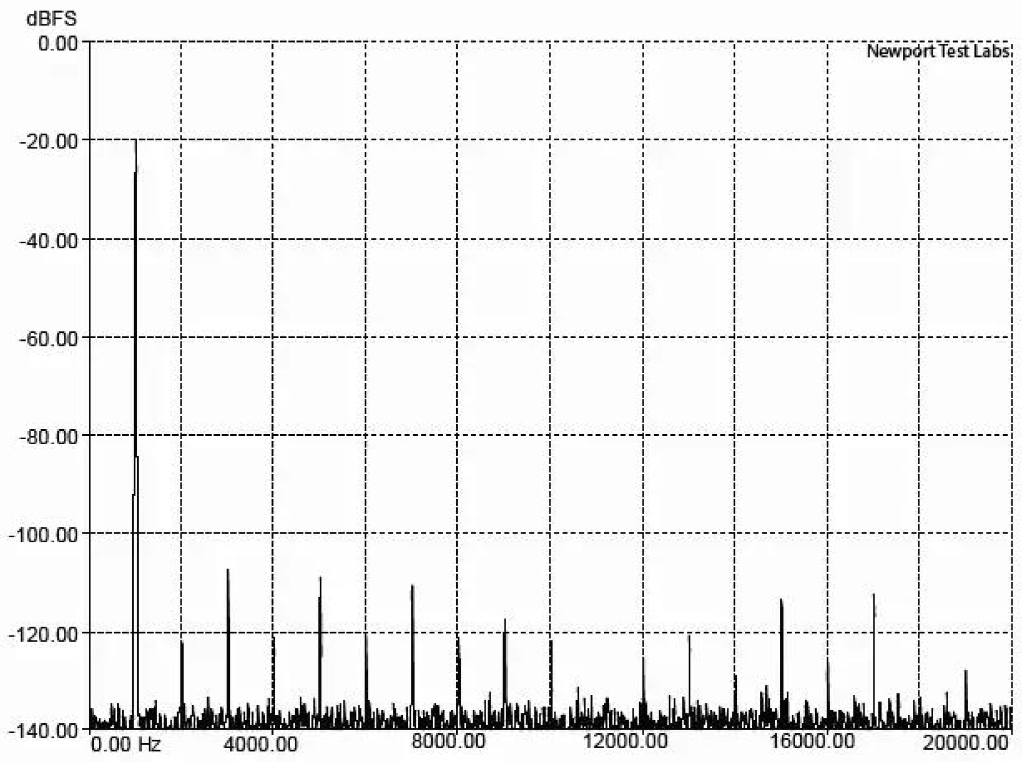
The de-emphasis error results are interesting, not because they're so low but because their very existence reveals that the TCD-50 actually *has* a de-emphasis circuit — many manufacturers do not bother to include one because CDs manufactured in the last 30-odd years don't need one. Only some discs, manufactured in the 1980s, will benefit from being played by a CD

TAGA Harmony TCD-50 CD Player — Laboratory Test Results

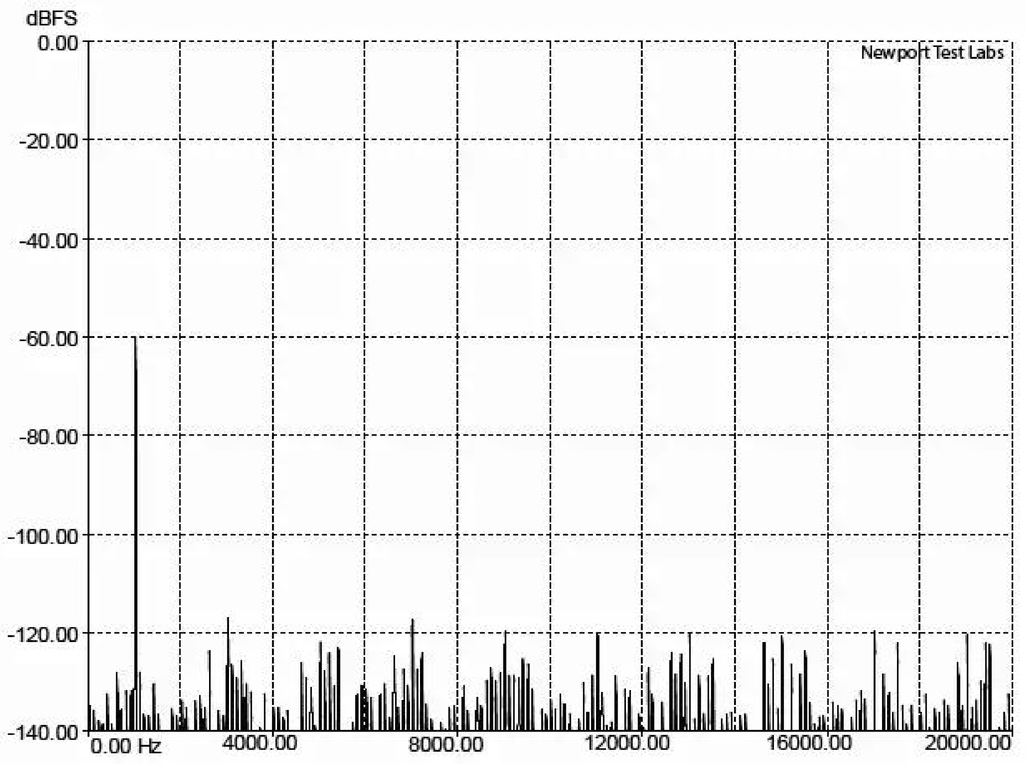
Analogue Section	Result	Units/Comment
Output Voltage (Unbalanced Outputs)	2.0299/ 2.0275	volts (Left Ch/ Right Ch)
Frequency Response	See Graph	dB (20Hz – 20kHz)
Channel Separation	139 / 136 / 113	dB at 16Hz / 1kHz / 20kHz
THD+N	0.0023	@ 1kHz @ 0dBFS
Channel Balance	0.011	@ 1kHz @ 0dBFS
Channel Phase	0.02 / 0.03 / 0.64	degrees at 16Hz / 1kHz / 20kHz
Group Delay	180 / 5.34	degrees (1–20kHz / 20–1kHz)
Signal-to-Noise Ratio	105dB / 113dB	dB (unweighted/weighted)
De-Emphasis Error	0.16/ 0.84 / 0.26	at 1kHz / 4kHz / 16kHz
Linearity Error @ –60.00dB / –70.00dB	0.02 / 0.11	dB (Test Signal Not Dithered)
Linearity Error @ –80.59dB / –85.24dB	0.07 / 0.03	dB (Test Signal Not Dithered)
Linearity Error @ –89.46dB / –91.24dB	0.07 / 0.05	dB (Test Signal Not Dithered)
Linearity Error @ –80.70dB / –90.31dB	0.12 / 0.11	dB (Test Signal Dithered)
Power Consumption	0.49 / 12.37	watts (Standby / On)
Mains Voltage During Testing	235 – 245	(Minimum – Maximum)



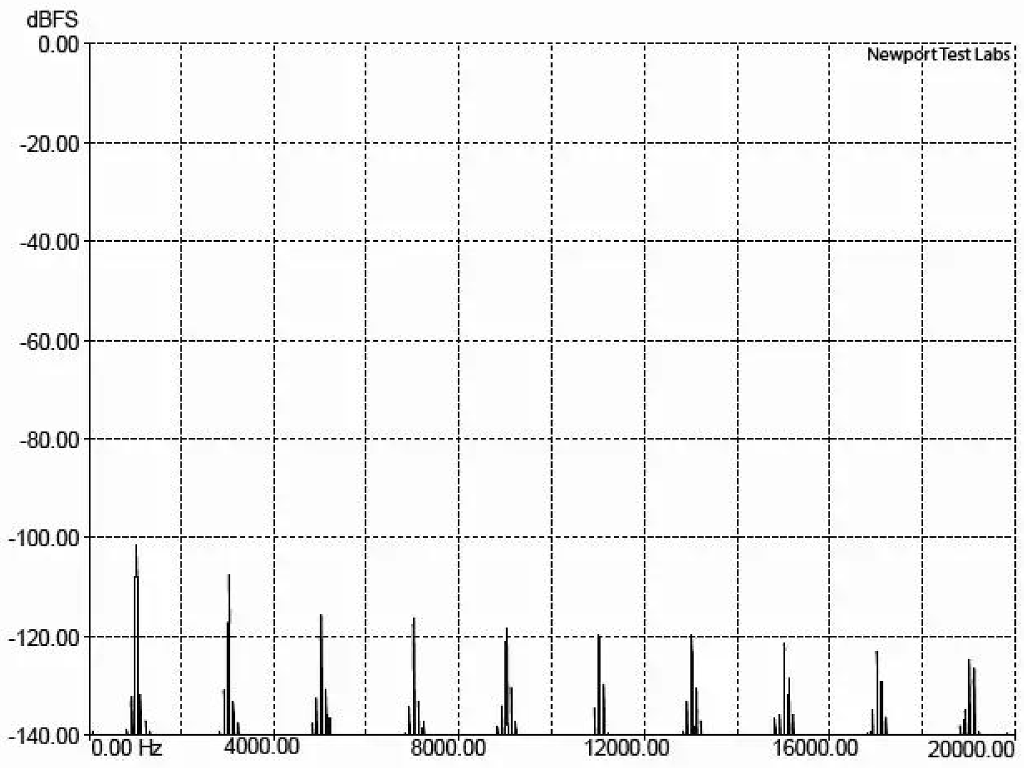
Graph 1. THD at 1kHz, 0dB recorded level



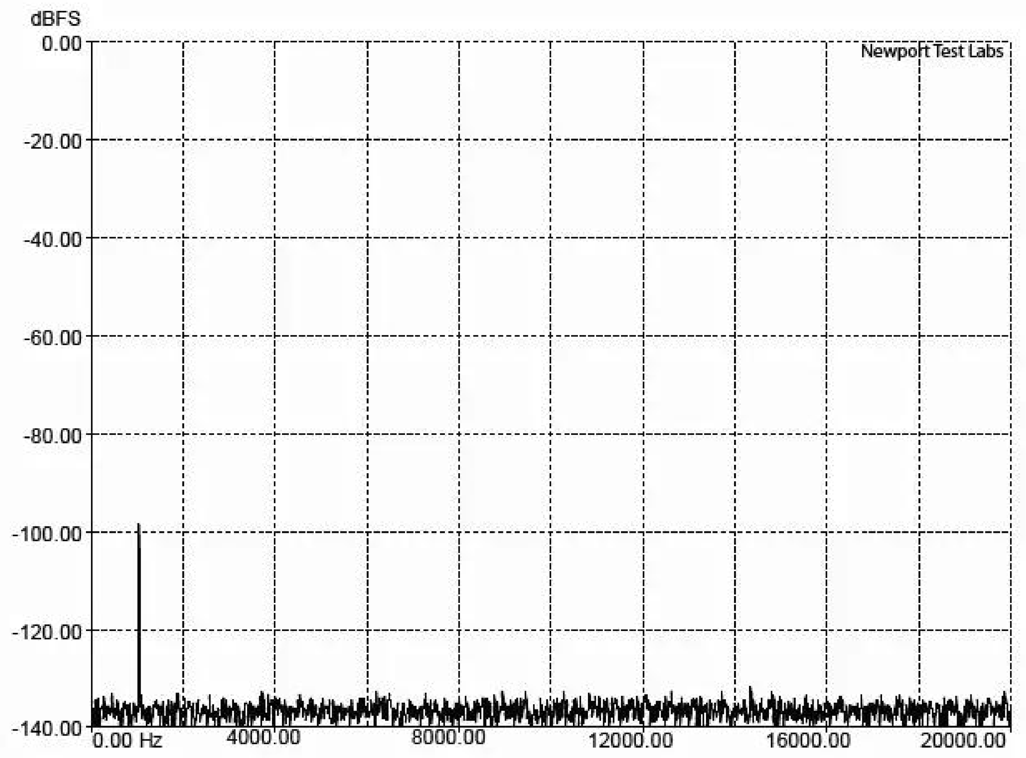
Graph 2. THD at 1kHz, -20dB recorded level



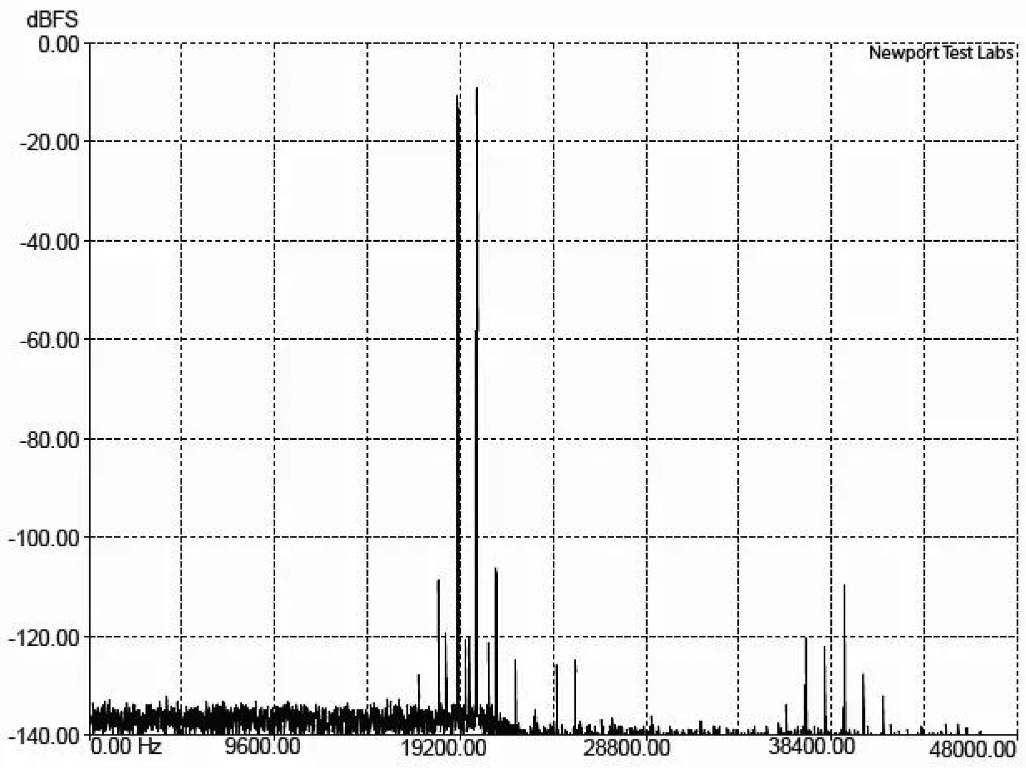
Graph 3. THD at 1kHz, -60dB recorded level



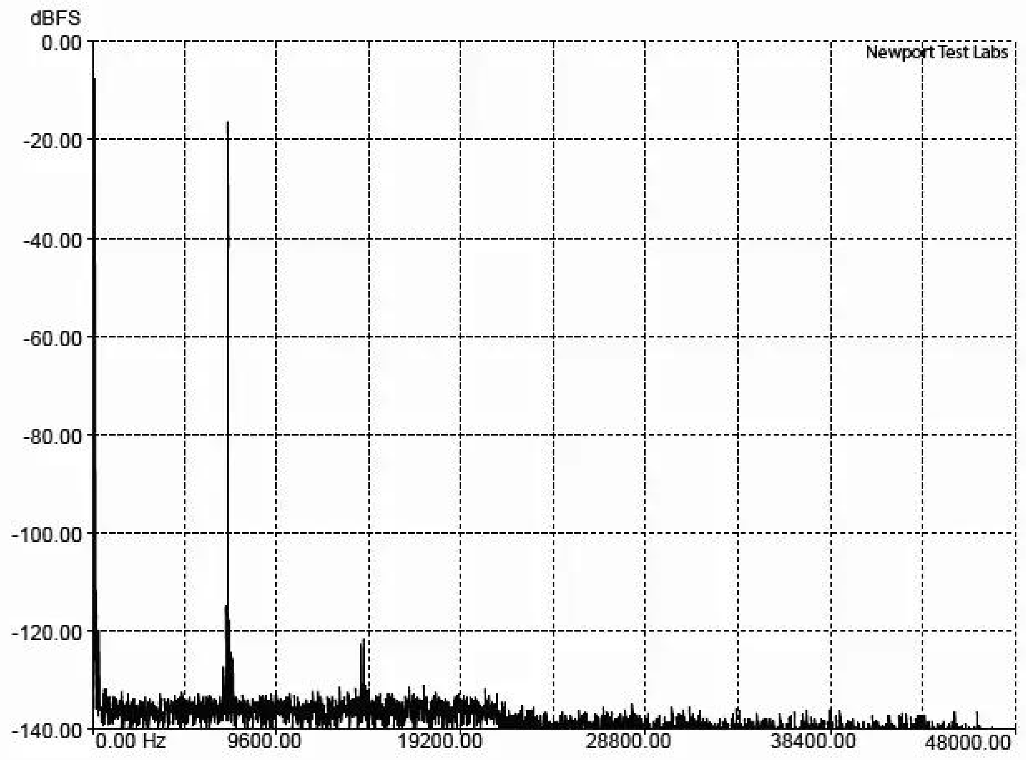
Graph 4. THD at 1kHz, -90dB recorded level, no dither



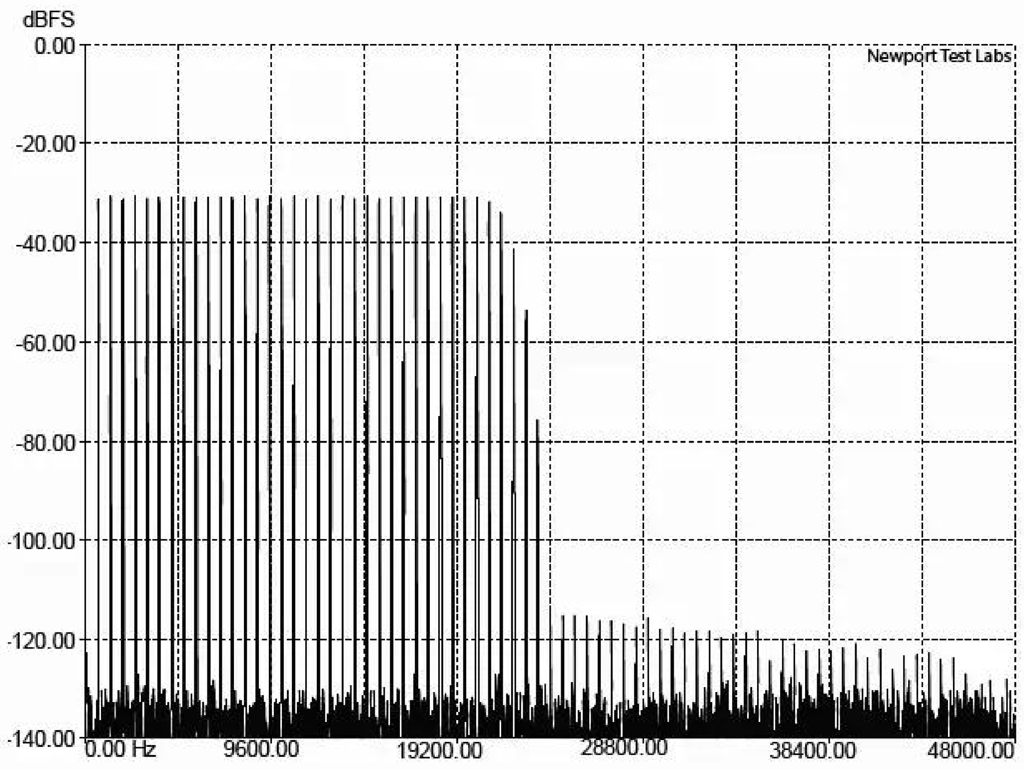
Graph 5. THD at 1kHz, -90dB recorded level, with dither



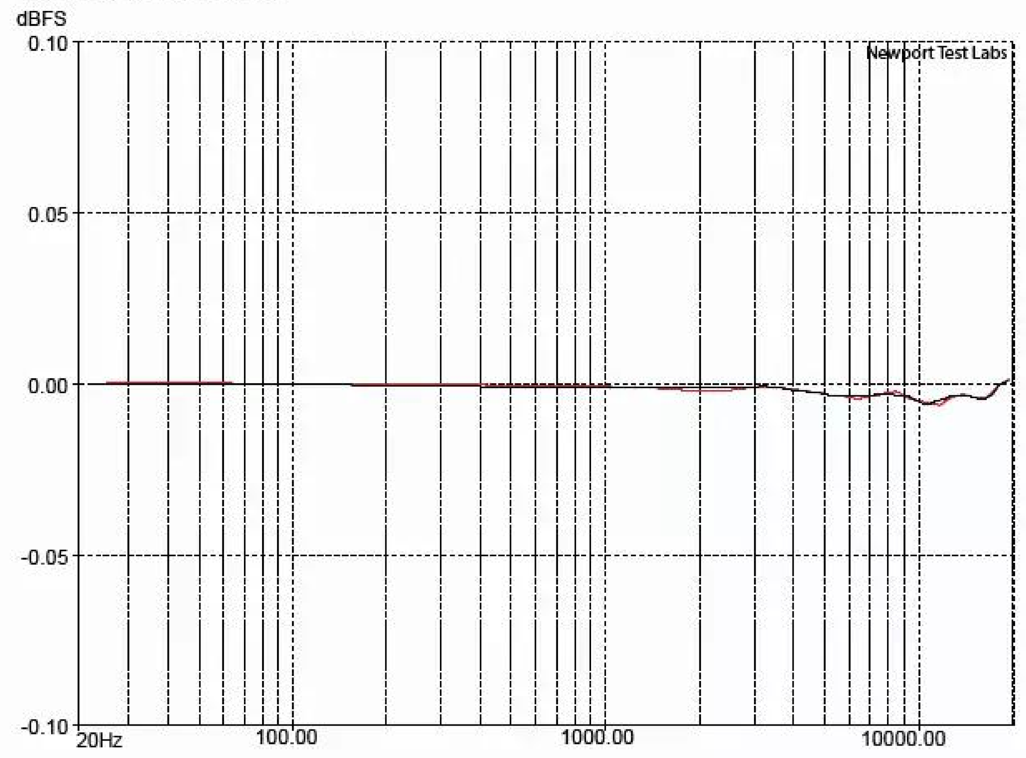
Graph 6. IMD CCIF twin-tone 19/20kHz 1:1 at 0dB recorded level



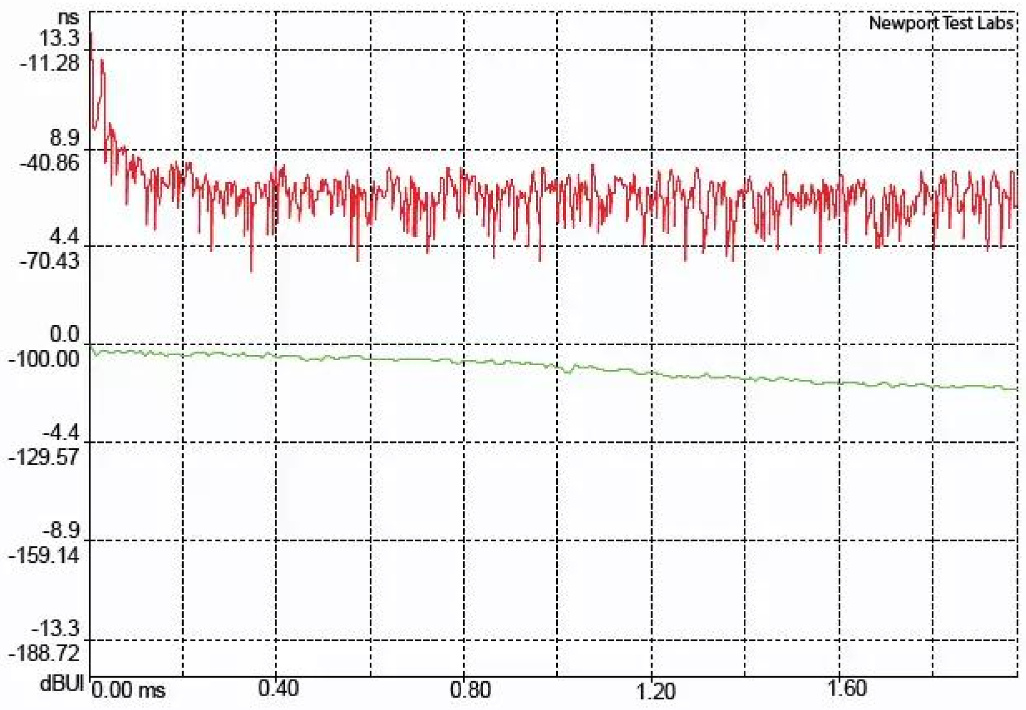
Graph 7. IMD SMPTE 60Hz/7kHz 4:1 at 0dB recorded level



Graph 8. Impulse Train at 0dB recorded level



Graph 9. Frequency response at 0dB recorded level — left channel (red) vs right channel (black)



Graph 10. Jitter spectrum

[Channel separation] at 20kHz is exceptionally good — many CD players struggle to get out of double figures

player fitted with a de-emphasis circuit.

Harmonic distortion was impressively low, too. Graph 1 shows the output distortion spectrum for a 1kHz sine wave recorded at 0dB (which is the signal at the far left of the graph), and you can see that there's a second harmonic at –117dB (0.00014% distortion), a third at –103dB (0.0007%), a fourth at –124dB (0.000063%), a fifth at –122dB (0.000079%) and a seventh at –130dB (0.000031%). There are some additional distortion components at higher frequencies, but as they're all more than 130dB down they would not be audible. Add all of these individual distortion components together and you get the result of 0.0023% THD, as listed in the test result table.

You can see from Graph 2 that harmonic distortion increases when the recorded signal level is reduced by 20dB. Looking only at the low-order distortion components out to the tenth, you can see that the even-order components are all around –120dB (0.0001%) and the odd-order components are all around –110dB (0.00031%), except for the tenth which is down at around 118dB (0.000125%).

Distortion at a recorded level of –60dB is shown in Graph 3 and is fairly typical for a CD player. The only harmonically related distortion components are all odd-order and close to, or more than, 120dB down (0.0001%). The myriad spikes you can see are introduced by quantization errors due to the undithered nature of the test signal (as you can see in Graph 4 and Graph 5).

Graph 4 shows the TCD-50's response to an undithered sine test signal at a recorded level of –90dB. Again you can see that all the harmonically related distortion components are odd-order (third, fifth, seventh etc) — the third is at –108dB (0.00039%), the fifth, sixth and seventh are all around –117dB (0.000141%), and the remainder are below –120dB (0.0001%). All this, along with the tiny spikes in the noise floor, is due to quantization errors because the test signal is not dithered. Graph 5 shows the distortion after the test signal has been dithered. The only signal that remains is the test signal itself (it's actually at –90dB but the trace is too faint to show when printed here). Remember that all commercial CDs are dithered, so this result is what you should expect when playing music.

Graph 5 also shows that the noise floor across

the audio band is impressively low — down at around –140dB — so the summed noise figures in the tabulated results are obviously affected by noise outside of the audio band.

CCIF intermodulation distortion is impressively low as well, as you can see in Graph 6. There is no regenerated signal difference signal visible at all (it would be at 1kHz if it were), and the IMD sidebands are low down: the 18kHz and 21kHz components are more than 120dB (0.0001%) down, and the 17kHz and 22kHz components are down at around –105dB (0.00056%). Some sampling-related artifacts are visible at the far right of the graph, but these are both too low in level and too high in frequency to be audible.

SMPTE intermodulation distortion was very low too, as you can see in Graph 7. The 60Hz test signal is almost indistinguishable from the left-most graph vertical, and the next signal is the 7kHz test one. There is a little distortion up around 14kHz (the second harmonic, plus some IMD components caused by the 60Hz test signal), but everything is still more than 120dB down (0.0001%).

Graph 8 shows the output of the TAGA Harmony TCD-50 when it's reproducing 630 single-sample pulses per second, which effectively shows the frequency response of the player within the audio band (also shown in Graph 9) and the frequency response above 20kHz. You can see that the in-band frequency response is very flat and that the response above 20kHz rolls off steeply and smoothly, just as it should.

The audio-band frequency response is shown in Graph 9 for both the left channel (red trace) and right channel (black trace), and you don't need me to tell you that they're both exceptionally linear. Yes, there's a little movement in the trace between 2kHz and 20kHz, but this is only visible because the vertical scaling of the graph has been so greatly magnified (the lines above and below the 0dB horizontal represent +0.05dB and –0.05dB respectively).

Newport Test Labs used a different technique to measure the TCD-50's frequency response below 20Hz (the tracking filter technique used to produce the graph cannot be used at low frequencies). It reported that the response remained at 0dB down to 2Hz, so the overall frequency response measured for the TAGA TCD-50 was 2Hz–20kHz ±0.02dB.

Graph 10 shows the jitter spectrum (measured via the digital output). Jitter amplitude was very low at 1.3nS peak-to-peak (0.007 UI). Linearity error was also very low all the way down to –90.31dB, where it was just 0.11dB. The complete linearity error result set is shown in the table.

Power consumption in standby was very low at 0.49 watts, conforming with Australian Government guidelines, while consumption during operation was just 12.37 watts, suggesting that the use of a toroidal transformer rated at nearly three times this was indeed overkill.

The oscillogram showing the TCD-50's handling of a 1kHz square wave shows the time-reversed ringing I'd expect from the use of an oversampling digital filter, while the uniformity of the reversal shows that the filter implementation is a 'standard' one — no special proprietary techniques are being used.

Overall, the TAGA Harmony TCD-50 CD Player delivered an exemplary performance on *Newport Test Lab's* test bench. **Steve Holding**

ADVANCE
PARIS
A12 Classic
dB/Watts-8Ω
Power
Peak
VOL-40dB
CD
Analog
Digital

Advance Paris A12 Classic

Stereo Amplifier

- Excellent performance
- True wealth of inputs
- Reliable, trouble-free operation

- Power-up time

Some audiophiles will always adhere to the belief that the preamplifier and power amplifier simply must be contained in separate boxes. After all, that not only allows you to pick from the best of each type but also often gives greater flexibility when it comes to connections.

French firm Advance Paris offers its own high-end power amps and preamps, but today I'm looking at its A12 Classic integrated, which it describes as an audiophile model. And — spoiler alert — it lacks nothing when it comes to performance, nor indeed flexibility.

THE EQUIPMENT

In short, the Advance Paris A12 Classic is a proper high-powered, analogue stereo amplifier, offering all the features of classic amps from old, but updated with modern digital audio too.

Within its substantial dimensions — the usual 43cm width but 19.5cm height and 44.5cm depth, making for an impressive mass just shy of 18kg — is an analogue preamplifier, a Class A/B power amplifier, and a DAC.

The preamp section is fitted with a phono preamp, and not just the usual cheap moving-magnet module either. Next to its RCA inputs are two switches for setting gain and capacitance. There are three gain levels: one for moving-magnet cartridges, one for standard low-output moving-coil cartridges, and one for high-output moving-coil cartridges (which are generally, despite the name, lower in output than moving magnet ones). Three capacitance settings are also available.

Let's talk a little more about the available connections. It strikes me that Advance Paris' approach would seem to be a no-brainer in amplifier design, but isn't one many makers actually adopt. That is, to provide the amp with a wealth of inputs and outputs. It's such a low-cost thing to provide, and yet is such a convenience to the user. Take the traditional stereo RCA inputs, for example — in addition to the dedicated phono inputs, you don't get two or three but five!

You also get two pairs of balanced XLR inputs for accepting the highest-quality signals from appropriately equipped sources.

There's also an 'Amp In', allowing you to use the A12 Classic's power amp section with another external preamp. That would seem like a disaster waiting to happen, except that Advance Paris has this switched off by default; it must be enabled in the set-up menu.

Three optical inputs sit alongside three coaxial ones, while an AES/EBU XLR is present

and correct for those who want to connect a professional-level device that has such an output. You can also plug in a USB memory stick loaded with music; connect a computer to use the A12 Classic as a USB Audio device; or fit the Bluetooth dongle (which in Australia is an included accessory; I'm not sure about other territories since much of the documentation lists the dongle as optional).

I must not forget the HDMI sockets, too. One is for input only from a source device, while the other is for connecting the amplifier to the Audio Return Channel (ARC)-equipped HDMI socket on a TV so that you can use your audiophile system to play back the 7 o'clock news… or the movies and shows on broadcast and network TV with high-quality sound! Alternatively, you can connect your TV and A12 Classic via optical connection (presuming your telly has an optical output, of course).

I expected that the Advance Paris amp wouldn't support video from the HDMI input to the HDMI ARC input/output, but, duty-bound, I popped some discs into my Ultra HD Blu-ray player (which was plugged into the HDMI input) to see what would happen to the LG OLED TV plugged into the HDMI ARC socket. And indeed, the discs' video went to the screen while the appropriate sound emerged from the Dynaudio loudspeakers attached to the A12 Classic. It turned out that the video was 1080p, even with Ultra HD discs. And I'd set my player to auto-video output.

I don't see how this performance could be significantly improved upon by a dedicated headphone amplifier

Is this a problem? It would be if this were a high-end home theatre receiver whose primary purpose was delivering movies. But for me, this is merely a convenience. If you *do* need the highest-quality picture, you should get a suitably high-end disc spinner that has separate video and audio HDMI outputs. Then the video need not run through the amplifier at all.

So, what have I discovered so far? Simply that not many people will have more devices than there are inputs available on the A12 Classic. Now, with so many inputs to hand, you might reasonably think that an inordinate amount of time is required to cycle through them all whenever you want to switch inputs. But this is partly resolved by the remote, which has four dedicated input selection keys that each cycle through only a small subset of inputs. There are, however, no shortcuts for the Bluetooth, phono or HDMI options.

As for outputs, you get 'A' and 'B' speaker binding posts (limited to six ohms minimum if you are using both), pre-outs via balanced XLR or RCA, and a fixed-level 'Record Out' (also RCA). Each of the two subwoofer outputs appears to offer summed mono and has an attached switch allowing you to choose a low-pass filter — 75Hz or 150Hz. Nice.

PRIVATE LISTENING

And that's not all. On the front panel are two headphone sockets: one for the traditional 6.3mm stereo headphone jack, and the other for the 3.5mm version.

Ho hum, you might think. But I got excited by this. You see, the majority of headphone outputs on otherwise-fine integrated amplifiers or home theatre receivers are, not to put too fine a point on it, crap! Sometimes the design pipes a little of the main amplification to the output, and whacks a great big resistor in line to get the voltage down to something suitable for headphones. Sometimes they use a so-so op-amp with an in-line resistor to protect things. In the former case, the resistance is often north of 500 ohms; in the latter, it's closer to 100 ohms.

In both cases, this causes frequency response variations in many attached headphones. Planar magnetic models tend to have a flat impedance across the audio spectrum, but dynamic headphones generally have major impedance variations by frequency. In other words, the tonal balance varies when there's an in-line resistance, and in many cases that can make or break for headphone sound quality.

So, why was I excited by the A12 Classic's headphone outputs? Because Advance Paris has built-in separate headphone stages, and for each output there is a hard-wired switch on the back panel to select an output impedance of either 100 or 0 ohms. I don't believe the latter figure, but let's regard it as aspirational. State-of-the-art headphone amps can manage something in the region of one-quarter to one-half an ohm. Keep things below a couple of ohms and the effect on sound is effectively unnoticeable on all headphones. Well done, Advance Paris, I say.

Inserting a jack into either of the sockets switches off the main amplifier — and yes, you can use both at the same time. Each output also has a gain switch associated with it — -4dB, 0dB or +6dB — so you can use two pairs of headphones of different sensitivities and roughly match their levels.

A BIT OF POWER

We're this far into things and I haven't really talked about the power amplifier section. So what is there to say? Well, it's Class A/B, a magnificently developed technology by this point, and rated at 190 watts per channel "RMS" into eight ohms. (The quote marks are to forestall objections — correct ones — that RMS is not a

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suitable descriptor of power outputs. But what it actually means in the real world is that the power output has been calculated using the maximum unclipped RMS voltage output, for which it is a suitable descriptor.)

The rated output at four ohms is 280 watts per channel. And again, if you're wiring up two pairs of loudspeakers for simultaneous use, the minimum impedance of both should be six ohms.

All Class A/B amplifiers have a bias applied to the signal to shift the waveform somewhat away from the 'zero' point, where the output resistors switch from dealing with a negative signal to a positive one, and *vice versa*. This avoids, or at least reduces, crossover distortion. The A12 Classic has yet another switch on the back — one that engages a 'high bias' mode. This pushes the bias higher so that the switch from negative to positive and back again happens at around one watt of output. That means that (except when you're playing very loud) the majority of the music will be in pure Class A mode with no crossover distortion at all.

The cost of this mode is higher energy consumption and greater heat production, so it's probably only worth using if you're really trying to stretch to the final frontiers of high performance.

Lastly, I must mention the front panel, which is dominated by two large and downright lovely blue VU meters, calibrated to show power output into eight ohms, and also dB. These are traditional analogue needles on a panel. I've never truly been convinced about the usefulness of VU meters in amplifiers, but by golly do they look good!

Between the two VU meters, behind the glass, are a couple of smallish vacuum tubes that are employed in the preamplifier section to provide, says Advance Paris, "a musical sounding amplifier without aggressiveness". I personally lean toward the view that 'tube sound' has more to do with power amplifiers, specifically the differences in the distortion characteristics between them and solid-state output stages. But I have to admit, their gentle reddish glow is wonderfully attractive.

SET-UP

Several functions are available through a menu controlled by manipulating the three front-panel knobs. Those knobs are spun metal and each is surrounded by a thin ring of light. Some evenings under the warm LED downlights, the knobs look almost golden.

> I've never truly been convinced about the usefulness of VU meters... but by golly do they look good!

These settings allow you to enable the default-disabled power amp inputs, change the delay of (or switch off entirely) the auto no-signal timer for switching off the unit, and adjust other minor things, such as the bass, treble and loudness — or bypass all of those. (I used bypass mode throughout this review.)

All that sounds pretty digital, but it seemed clear to me that this was simply a digital control system acting upon analogue circuits.

LISTENING SESSIONS

Before even thinking about listening to the A12 Classic, I should note that it is not an amplifier for those in a rush. When you power it up, it shows a clock on the right-hand display panel (the left-hand one shows volume level) counting down the seconds from 30 to zero. This allows time for the preamplifier tubes to warm up. Even when you change inputs, it takes a second or two before things are ready to go.

Those, I must point out, are my only two criticisms of this Advance integrated — which, now that I've typed them, seem pretty weak sauce even to me.

Before getting to the main game, which is listening to music fed to the analogue and standard digital inputs, let's first look at a couple of those 'extra' inputs...

Deciding to give the regular USB (Type-A) input a whirl, I plugged in my music-laden USB SSD. I was wondering how — or even whether — I could select tracks for playback. But after half an hour, I unplugged it again — the unit had just shown "Loading" on its display for that whole time. To be fair, the SSD is two terabytes in size and contains about a terabyte of music, amounting to several tens of thousands of tracks. Clearly, the unit isn't designed for that purpose. So I stuck in a standard USB memory stick loaded with a few tracks, and the amplifier started playing them back within seconds. The play/pause and track-skip buttons on the remote worked nicely, but note that there's no other way of selecting from a large number of tracks.

The test audio files it supported were FLAC in 44.1kHz and 48kHz, and MP3. (I didn't try WMA — does anyone still use that?) The input does not support higher-resolution FLAC, nor standard Apple-flavoured AAC, Apple Lossless or DSD.

This brings me to the USB Type-B connection, to which you can connect a computer. The A12 Classic appears to the computer as a standard USB Audio device, so you can simply select it either with the Windows or MacOS settings apps, or with your player software that allows the computer's audio systems to be bypassed.

I used my Windows 11 notebook computer and JRiver Media Player software to stream music from my server, as well as Tidal, which similarly allows bit-perfect digital audio. All of it sounded great… except for the music which didn't. With the kind of transparency this Advance Paris amplifier offers, there's no hiding the lousiness of some recordings. But the stuff I know to be high quality, not to mention a surprising amount of 'regular' music, simply sounded great — especially at higher volume levels.

And that was regardless of the bias setting, too. I used the amplifier in the more-Class-A setting for about a week, bracketed by the standard setting. To me, the extra heat generation and power consumption didn't seem worthwhile for effectively indistinguishable sound. That said, I should note that the power output even in that mode was plenty for clean, loud sound. I was using Dynaudio Contour 20i loudspeakers, which are about 3dB/W less sensitive than average high-quality loudspeakers and have a nominal impedance of four ohms, so they can be a difficult load for some amplifiers — but not this one.

When using the unit as a USB Audio device, I was pleasantly surprised. I'd already noticed that the specifications listed the DAC as a Burr-Brown PCM 1796. This a high-quality, highly reputable chip, last updated in 2006 (these days it's from Texas Instruments) with a rated 123dB signal-to-noise ratio. It supports Direct Stream Digital, along with PCM up to 192kHz. Yet, when I played even *higher*-resolution music using JRiver with the WASAPI audio driver selected — 384kHz PCM as well as both regular DSD and the double-speed DSD128 variant — the A12 Classic happily accepted them. Naturally, I could not say for certain what the amplifier was doing inside (just ignoring every second sample, perhaps?), but according to JRiver, those signals were going out properly, and according to the amp's front-panel display, they were the signals being received.

I appreciated the front-panel display of the signal standard, by the way. It's all too easy to mess up the settings in a computer and have it process or downsample digital audio, so a visual confirmation that the signal is correct is extremely useful.

As for Bluetooth, the included dongle is specified to support the aptX codec, and naturally would play ball with the standard Bluetooth SBC codec too — but AAC wasn't mentioned. However, when I connected my iPad, the front panel indicated that it was receiving AAC. Likewise, I confirmed aptX transmission using my Google Pixel phone. In both cases, sound quality was about as good as you can get with Bluetooth. In other words, it's fine for background use but falls short for attentive listening. For example, Alicia Keys' *Songs in A Minor* (which is what's playing as I type this!) had a full but slightly flabby bass, plus a touch of harshness in the higher registers.

My serious listening was all via S/PDIF, XLR and phono inputs. I had a DAB+ radio,

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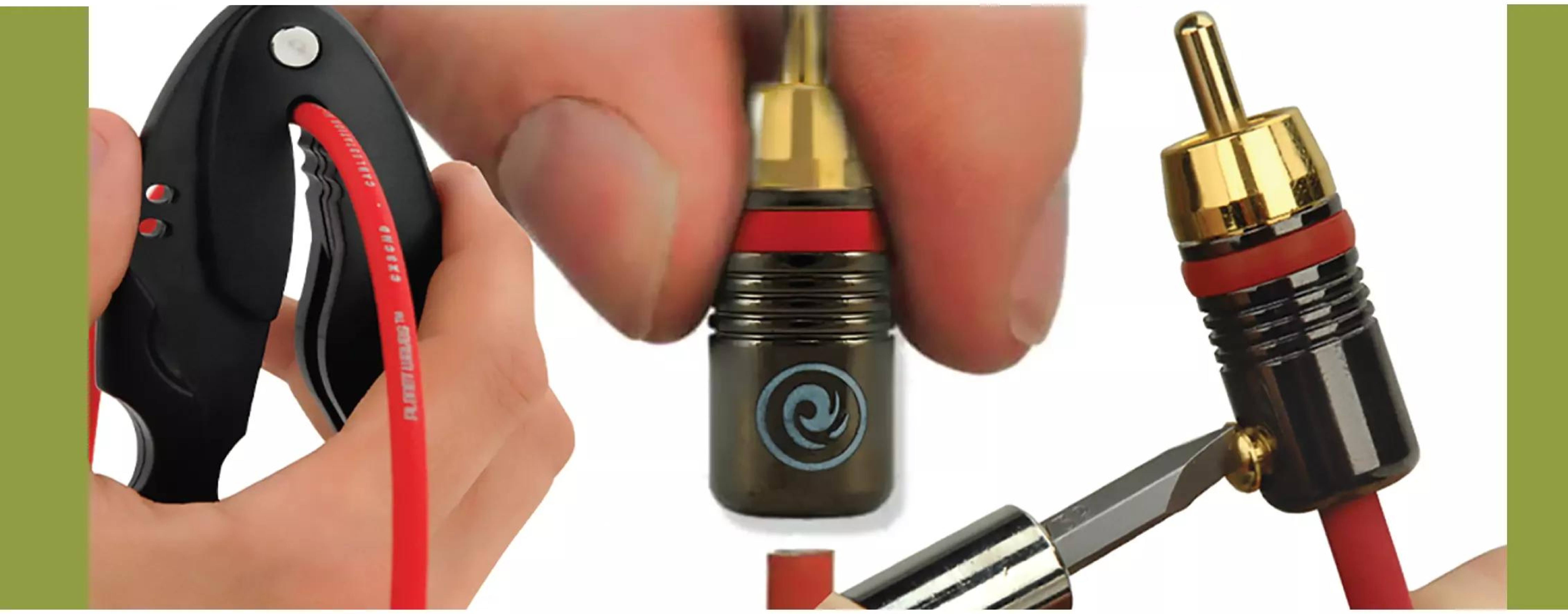

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a Cambridge Audio CD transport, an Oppo universal disc player and a (newly acquired) WiiM media streamer plugged into S/PDIF inputs. Most of the time, I had the balanced output from my phono preamp (into which a Thorens TD1600 turntable fitted with a Goldring Ethos moving-coil cartridge was connected) plugged into one set of XLRs, while the phono input was saved for the Audio-Technica AT-VM95SH moving-magnet cartridge installed in a Technics SL-1500C turntable (obviously with its internal preamp switched off).

The S/PDIF inputs are rated to support stereo PCM up to 24-bit/192kHz. In a lot of equipment, only the coaxial inputs are rated up to 192kHz while optical is limited to 96kHz. But I had a 2000-released Denon recording of Beethoven's 5th piano concerto on DVD Audio disc playing in the Oppo, and its 24-bit/192kHz stream came through via optical perfectly, with the Steinway sounding simply astonishingly beautiful.

You will probably never lay your hands on that disc, but you will be easily able to stream the title track of Billy Paul's 1973 album 'War of the Gods' from Tidal. Delivered via Tidal Connect and the WiiM player to the A12 Classic via optical, the performance was immaculate, with a superb soundstage and extremely well-controlled bass.

That soundstage was maintained throughout just about all the music I played, especially the higher-quality tracks — *Authentic Celestial Music* by Dirty Three, *Liberty* by Anette Askvik, and just about anything from the variety of Telarc classical CDs I'm gradually acquiring.

And then there was vinyl. I played good old Billy Joel — but not as too many people have heard him: from the 1981 CBS Master Sound Half-Speed Mastered release of his 1978 album '52nd Street'. I bought it new back in those days and the pressing was and remains immaculate. Reproduced by the Technics/Audio-Technica pairing and A12 Classic, the results were simply wonderful — great timing, with everything in complete order, and the Dynaudio speakers were well-driven, offering an excellent presentation of percussion in particular.

When side one finished, instead of turning it over I switched turntables, plugging the Thorens/Golding duo into the amp and flipping the phono switch to moving coil. The results were similar, except with a slightly increased level of 'being there' realism. Indeed, the moving-coil phono preamp works very nicely.

Finally, the headphones. To my ears, using both my ancient Sennheiser HD 535 open-backed dynamic headphones (which cost around $300 back in the mid-90s) and relatively new Final Audio D8000 planar magnetic headphones, I don't see how this performance could be significantly improved upon by a dedicated headphone amplifier.

> ... not many people will have more devices than there are inputs available on the A12 Classic

CONCLUSION

Have a look at the images accompanying this review. If the aesthetics please you (they certainly did please me, though naturally we all vary on that front), the price is within your target range, and you're looking for a new integrated amplifier, my advice to you is this: find an Advance Paris dealer and go and have a listen to the A12 Classic. You won't regret it. ***Stephen Dawson***

TECH SPECS & CONTACT

Brand: Advance Paris
Model: A12 Classic
RRP: $4,499
Warranty: Three years

Inputs: 5x stereo analogue RCA; 2x balanced stereo analogue XLR; stereo phono (RCA — MM & MC); 3x coaxial digital; 3x optical digital; AES/EBU digital; 2x HDMI (1 via ARC); USB Type-A; USB Type-B (as USB Audio device); Bluetooth (via included BT dongle); stereo power amplifier RCA
Outputs: A & B stereo speaker (switchable, binding posts); balanced stereo analogue pre-out XLR; stereo analogue pre-out RCA; stereo analogue record out (fixed-level RCA); 2x subwoofer RCA; HDMI (as per input); 2x headphone (6.35mm & 3.5mm)
Other connections: 2x Trigger out; ground for phono; USB Type-A (for update and external device power)
Power output: 2 x 190W RMS (8 ohms); 2 x 280W RMS (8 ohms)
Distortion: < 0.006% @ 1kHz/1W; < 0.02% @ 32W
Accessories: Remote control, proprietary X-FTB01 Bluetooth adaptor, batteries, power cable, manual
Dimensions (HWD): 19cm x 43cm x 44.5cm
Weight: 17.9kg

Distributor: Synergy Audio Visual Pty Ltd
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Vivid Audio Kaya S12

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- Stunning clarity & detail
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Vivid Audio's speakers are famously curvy. Its Giya range is described by the South African company as "a direct, deliberate challenge to every aesthetic and acoustic convention" — although some of the acoustic principles behind them are rooted in ideas that its chief designer Laurence Dickie had previously developed when creating Bowers & Wilkins' famous Nautilus 'snail' speaker, a no-holds-barred project that had been handed to Dickie after the passing of John Bowers himself.

Key to that design was the idea of tapered tube loading (TTL) to absorb the back energy from drivers, energy which would otherwise cause reflections within the cabinet and interfere with the forward radiation, colouring the sound. These tapered tubes contain wool fibre as a damping material, and this is increasingly compressed as the tube tapers, absorbing all sound by the end, so that nothing is reflected back through the diaphragm. Absorbing rather than merely containing the back energy is seen as key to the clarity of the performance of Vivid Audio's loudspeakers.

You can see this idea in action on any Bowers & Wilkins speaker with the famous tweeter-on-top and a 'Nautilus' tube behind it.

But at Vivid Audio, Laurence Dickie applied his "exponential absorbers" as a standard solution for all the drivers, and the extraordinary shapes of the Giya range are the direct result. There was nothing aesthetic about it: Dickie's designs were pure form following function. Yet as with that earlier Nautilus, their beauty is undeniable, as if we naturally recognise the appeal of a perfect engineering design.

Beautiful the flagship Giya collection may be, they are not for every home. That led to the Kaya range. 'Kaya' is the Zulu word for 'home', says Vivid Audio, and is used appropriately since the company was originally founded in South Africa and its production facilities are in the garden province of KwaZulu-Natal. Its design, technical and administration are a little further north… in West Sussex, England.

BUILD & DESIGN

The whole Kaya 'home' concept was intended to extend Vivid's skills to sleeker and more compact enclosures (in relative terms), creating speakers that integrate more easily into smaller spaces — "perfect for rooms where the sound system is part of the space, rather than the main feature", as Vivid puts it. The company enlisted the aid of Matt Longbottom and Christoph Hermann for their industrial design, both of whom worked at Lovegrove Studios for industrial designer Ross Lovegrove, the man responsible for the exterior design of the KEF Muon, among other things.

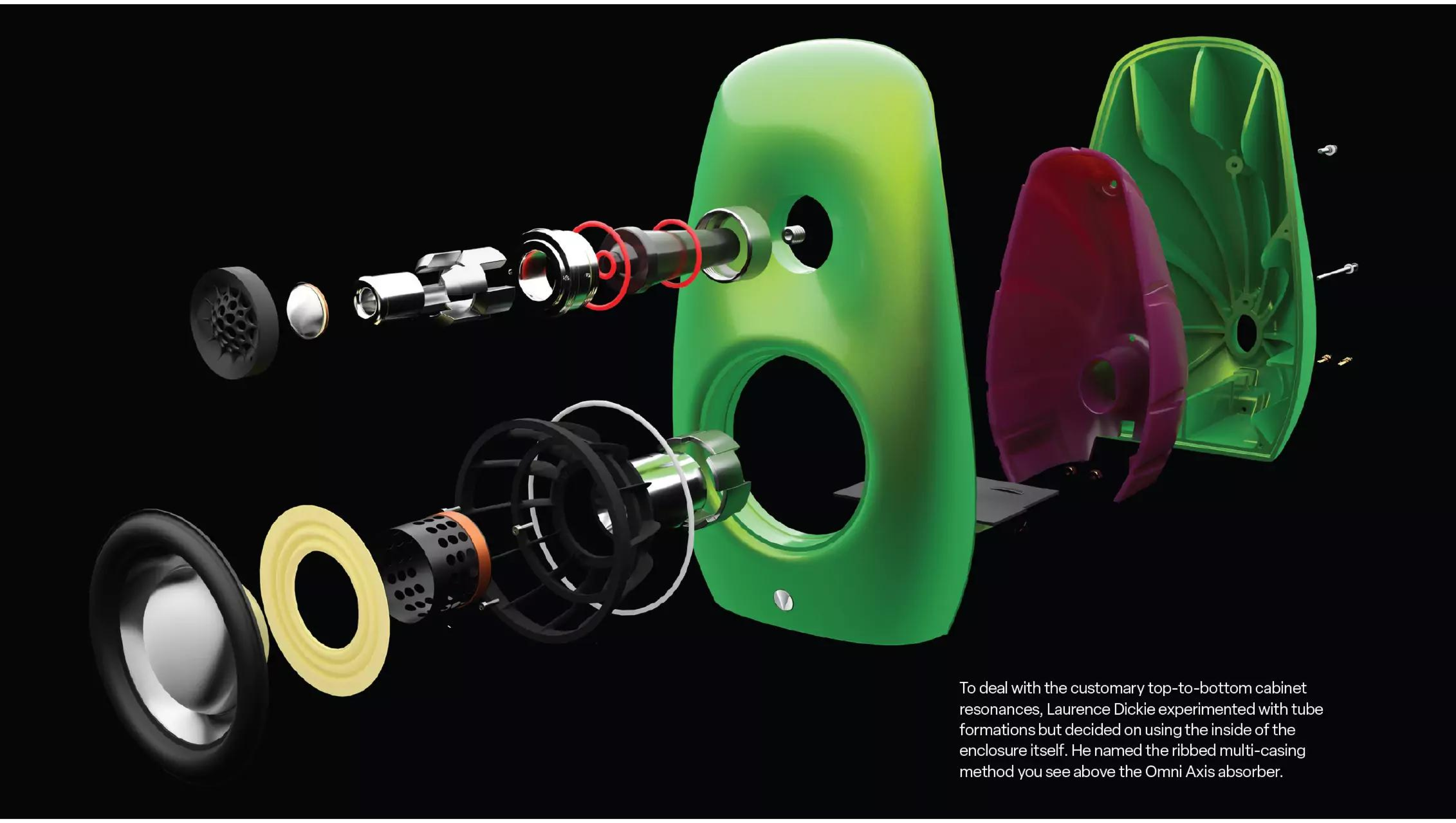
I do like the naming convention for the Kaya range, another tilt to the engineering, since the numbers speak directly to each model's internal volume: from the 90 litres of the large floorstanding Kaya 90, through the Kaya 45 to the slender and attractive Kaya 25, down to the mere 12 litres of the latest model, the Kaya standmounters you see before you on this page. This simple system of nomenclature is thus user-friendly, given that the curvaceous shapes preclude any other easy calculation of cabinet volume (immersion in water might be the easiest way, but no doubt problematic in the longer term).

While the other Kayas are called simply Kaya 90, Kaya 45, etc., these standmounters gain an 'S' to make that clear, so 'Kaya S12'. There are dedicated stands, to which you might say 'meh' until you see them, as they extend the curve concept and make the S12 look still more space-age and other-worldly. The stands also provide security and stability for what are remarkably light loudspeakers that might be less secured merely sitting on random stands, especially if out into the room. The enclosures are formed from what Vivid calls RIMCast PU resin, a kind of initially liquid polyurethane that pours like water into a mould, reproducing the finest details.

And again this isn't done simply as a way of generating attractive shapes: the construction method also makes the enclosures very stiff when compared to wood.

The construction method also means that the outer layer can be tinted in almost any colour you want, which is very handy if you want the speakers to match the décor of your room. I first saw the S12 in a marvellous tree-frog green at the Australian Hi-Fi Show in April; however, that is a 'bespoke' colour option that increases the price. The pair I later reviewed were in a Lexus Pearl White finish, one of the $11,000 standard options with Piano Black and Oyster Matte.

The Kaya range follows all Vivid Audio speakers in using the company's D26 anodised aluminium alloy tweeter, which tackles break-up resonances in a couple of unusual ways. Firstly, there's its shape, described as a Catenary Dome Profile (CDP). In geometry, a catenary is the curve formed when a long cable is supported at



To deal with the customary top-to-bottom cabinet resonances, Laurence Dickie experimented with tube formations but decided on using the inside of the enclosure itself. He named the ribbed multi-casing method you see above the Omni Axis absorber.

its ends and then hangs under its own weight — a hyperbolic cosine curve, this is, which differs from a parabola in having a less defined peak. Simple suspension bridges (those without chains or cables) hang in this natural catenary curve, and when inverted it is an efficient form of arch which minimises materials and will always support its own weight. Gaudi was a particular fan of catenary arches, and to give a more modern example the famous golden arches of McDonald's are also more catenary than they are parabolic in their curvature.

Use a catenary curve to describe a 3D domed surface and it turns out to have a first break-up mode almost an octave higher than a conventional spherical tweeter dome (to above 44kHz, I gather). This handily minimises resonances in the audible band and promises to keep the midrange clear of irregularities.

In addition to their shaping, Vivid's tweeters use Dickie's innovation from some decades ago of adding stiffness by surrounding the dome's edge with a ring of highly stiff carbon fibre; this pushes break-up frequencies still higher.

The dome is mounted atop an edge-wound aluminium voice coil that is driven by eight radially polarised neodymium iron boron magnets. According to Vivid Audio, the magnetic flux density in the voice-coil gap that results is so powerful (2.4 tesla) that it could not use ordinary ferrofluid, so Ferrotec Corp (USA) was commissioned to formulate a special recipe specifically for the D26.

And behind the tweeter, hidden in the cabinet, is that fibre-damped, exponentially tapered tube which, says Dickie, "has an acoustic performance identical to that of an ideal enclosure, being completely free of resonance or reflection."

The tweeter crosses over at 300Hz to the mid/bass unit, designated a 'C100L', a 100mm alloy cone unit with a notably bulbous dustcap, again an unusual shape which apparently pushes the cone break-up frequency out-of-band by increasing the frequency range over which the cone (and dustcap) move pistonically. Vivid Audio claims most manufacturers either use a dustcap simply to keep dust away from the voice coil or as a way of boosting high-frequency output after the main cone has entered into its break-up zone.

Despite the relatively small cabinet of the Kaya S12, the mid-woofer still enjoys a form of exponentially tapered tube loading. Indeed it was discovered that this would have to address not only the usual top-to-bottom cabinet resonances but also, in this smaller two-way model, horizontal resonances. Dickie experimented with a 3D dodecahedron of tubes, then a version folded up into a ball, but he ended up using the inside of the enclosure itself instead, with an inner casing (in maroon, pictured above) sitting inside the internal moulding (green), with a series of lateral ribs then forming the channels of the absorber, an arrangement Vivid has called an Omni Axis absorber.

The crossover board sits down at the bottom and offers a single pair of gold-plated, banana-friendly sockets just below the small rear port, making bare-wire connections a little fiddly, though not as much as with larger Kaya models, partly because the S12 are more easily moved around, being quite light (just 6kg each). The minimal weight is something which would also make me less worried about trying their other mounting accessory, a neat — and of course

Up for an audition of the Kaya S12? For God's sake, turn them up! It's where they come to life… how they surprise

curvy — wall bracket.

PERFORMANCE

Any idea that the smallest Kayas might be all midrange and top but no bass was swiftly dispelled by hearing the rich bass underpinning the Dark-side mix of Peter Gabriel's *Four Kinds of Horses*, both the tight Tony Levin stabs of almost synth bass, and in the rolling drone which underpinned the whole soundscape, especially deep over the choruses. A sweep showed them picking up full strength above 160Hz, but with a useful audible response right down into the highest 30s of hertz. While they offered nothing for the contrabass D (around 37Hz) of *Stereophile*'s organ bass tester, they had no problem sounding out the G (at 49Hz).

So no real worries about support from below; it is perhaps never going to dominate, so I might have said the S12 are not going to be a dance lover's dream. But in fact, the first time I cranked them into skyward territory was during their warm-up period to entertain a visitor who wanted to hear what these curiously bulbous $10,000 standmounts could do. And her choice was French musician and DJ Clo-Zee, whose 'Neon Jungle' remixes are full of wide detailed audio cues which the Kayas portrayed magnificently, including the pulse of the synthesised 'bottom F' on the first track, *Perfect (Of the Trees Remix)*: that's 44Hz, no problem, thank you.

The other bass delight for EDM fans is the speed of response here, the transient edges available particularly for the squarer pulses of electronic bass, and especially during any accelerating build-ups to drops — so tight, so much air-shifting available from the alloy bass cone that you could feel the pulses in the air.

This is perhaps the defining characteristic of the S12 across the frequency range: the sharp-edged clarity given to every element, and the impeccable soundstaging that comes with this clarity of detail. This brought acoustic recordings to absolute life. The recently released 1994 recording of Keith Jarrett playing sonatas by Bach's son Carl was spellbinding in its nicely simple stereo miking and further showed the even range of these speakers from high to low — a true realism of tone.

As is often the way with highly revealing speakers, they can sometimes be a little too revealing of less-than-perfect recordings. I couldn't on this occasion play Alex The Astronaut's early and wonderful *Already Home* too loudly, because the Kayas were pretty brutal on the boxy treated vocal; fine at moderate volume, but it just got boxier with more level.

This was unusual because, on the whole, the S12 just loved going loud; they begged for it. The better the production, the better they sound. 'The Dark Side of The Moon' (50th anniversary remaster) I turned up and up, so that I was in among the swirling synth lines of *Any Colour You Like*, enjoying Nick Mason's drums sounding astounding real, and was jolted by the flanged guitar break clanging in like a metallic bell before the guitar part becomes split across the stereo soundstage for the jam down into *Brain Damage*.

Look What You've Done by Radio Free Alice (the Melbourne band, not the Darlinghurst record shop) sounded fantastic, a big tom boom from the right channel before settling in all jangly Cure in the centre, and all that Vivid tightness allowing the kick drum to smack through the central scrum, over which the vocals emerged sounding engagingly real.

Female vocals were equally well served: Diana Krall was real and perfectly poised out in front of the mix singing 10CC's *I'm Not in Love*, while Taylor Swift on *Cruel Summer* sang out clear on the verses, though recessed enough on the choruses to again encourage us to turn things up higher, to get her voice sounding real, and then the music thumping and immersive. This was something of a characteristic which emerged: at lower levels, vocals could drop back in the presentation, perhaps the level of resolved detail in the rest of the mix had this effect, but the answer was always the same: turn it up to get the vocal sounding real, and the surrounding music would just burst into even greater life.

When I did this with *Getaway Car,* the S12 again revealed their available bass by rolling out the fundamentals on the powerful choruses — though again, to their best when they were playing nice and loud.

The reason I could keep turning up the Kaya S12 is because they remained so solid and audibly free of distortion. I had them at levels where lesser standmounts would scream and force me to drop them lower. Such is the balance here that you simply don't realise how loud they are running. It's great! If you audition a pair, I recommend you settle in, then nudge and nudge them up, and take the time to enjoy them loud; it's what they do best.

AND WITH MOVIES…

I had the S12 for about a month, and for part of that time I had them connected to our TV audio; they looked spectacular flanking the TV even with their rubber feet on a TV bench, while they will surely qualify as artworks in their own right when freestanding on their bespoke curvy supports flanking a wall-mounted screen.

I ran the Bowie doco *Moonage Daydream* on Netflix, and the S12 made it all so clear — magnificent and musical, wide and involving, diamond-sharp and, again, tight, tight, tight. This snap was doubly evident on the beats and rolling rises that chart the soundtrack of *Hip-hop Evolution*, where Grandmaster Flash, Eddie Chiba, Kurtis Blow and even soundtrack taken from old videos sounded crisp and kicking. Tonal accuracy and an ability to play loud without distortion benefit TV and movies just as much as music, of course, so don't hesitate to use the Kaya S12 in such a dual role.

Indeed there's a Kaya 35 centre speaker, so with a suitable subwoofer you could have a whole Kaya home cinema setup of gleaming bulbous speakers around the room; the clarity and kudos would be mega!

CONCLUSION

What didn't I like? Nothing! Only that if you listen to them at an ordinary volume, you won't be hearing them at their best. It's what they can do with a good amplifier at high levels which makes the Kaya S12 standmounts stand out musically, while their appearance certainly makes them stand out visually. Especially in tree-frog green.

Up for an audition of the Kaya S12? For God's sake, turn them up! That's the level at which Vivid's design ideals are confirmed; it's where they come to life, it's how they surprise, and it's when their wonderful detail and soundstaging merge with a surprising sense of power and solidity of bass. Remember that their beauty is not skin deep; it lies within. **Jez Ford**

TECH SPECS & CONTACT

Drivers: 26mm D26 alloy-dome tweeter; 100mm C100L alloy-cone mid-bass unit
Sensitivity: 85dB @ 2.83VRMS, 1m
Nominal impedance: 8 ohms (5.3-ohm minimum)
Quoted frequency range: 45Hz–25kHz -6dB
Dimensions (hwd): 237 x 400 x 254mm (but curvy)

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- Low sensitivity

RRP **$7,500**

Serhan Swift's newest loudspeakers, the mµ2 Mk II, are so different from the original mµ2 that, in my opinion, the two designers (Brad Serhan and Morris Swift) should have given them a completely new model name. Perhaps the duo thought the model name would gain some leverage from the very positive reviews the originals garnered from reviewers such as Stu Smith (*Hi-Fi Pig*), Jay Garrett (*StereoNet*) and Peter Katsoolis (*SoundStage*). Or maybe they stuck with it because the new model looks identical to the old one — the appearance of the bass/midrange driver and tweeter is similar, while the cabinet is exactly the same size and features exactly the same rear-firing bass reflex port. (There is, however, one obvious visual difference: the mµ2 Mk II sport a new, artisan-quality, matte-painted finish, available in either black or white.)

But Serhan Swift is adamant the latest mµ2 is a 'new' loudspeaker design: "The new mµ2 Mk II is a totally new loudspeaker," says Serhan. "All elements — cabinet, woofer, tweeter, crossover — have been carefully re-examined and significantly improved, even where many thought no further improvement was possible. Lessons learned from the original mµ2 Special Edition (as well as our ongoing research into the effects of vibration on all components) — have been expanded upon and applied to the mµ2 Mk II. The new multi-layer cabinet construction now employs additional layers of differing materials, carefully chosen for composition and thickness, for even further reduction in cabinet noise (vibration), energy storage and colouration. Bracing has been further strengthened and we use constrained layer damping material custom-manufactured for the mµ2 by Les Davis Audio."

"While the woofer and tweeter may look the same as the previous model," Serhan continues, "both have been improved with even flatter response, smoother roll-off, and lower distortion. Because of these driver improvements, we put in thousands more hours of listening tests and measurements in order to make enhancements to the high-order crossover, which features Solen premium quality air-cored inductors, polypropylene capacitors and non-inductive resistors to take full advantage of the driver improvements. The crossover and the on-axis to off-axis transitions are now even more seamless." Perhaps not just a mere facelift, then.

THE EQUIPMENT

As you can see from the image opening this review, the mµ2 Mk II is a two-driver, two-way standmount design. The mid/bass driver was developed, designed and hand-built in Videbaek, Denmark, by driver specialist Scan-Speak, a unit from the company's prestigious 'Revelator' range. (Although Scan-Speak is now owned by the Chinese-based Eastech Group, which also owns German driver manufacturer Punktkilde, it operates as a completely independent, Danish-controlled entity, just as Punktkilde remains German-controlled.)

That mid/bass driver is easily recognisable as a Scan-Speak Revelator due to the distinctive appearance of the 'sliced cone', which has grooves sliced into its paper surface in an effort to keep its break-up modes under tight control. The roll surround is moulded using Scan-Speak's 'low-damping' SBR rubber compound. Unlike those made from foam (which disintegrate after prolonged exposure to sunlight), this rubber surround is almost completely unaffected by climatic conditions due to its extremely flexible (to allow high-cone excursion) and extremely durable nature.

The Revelator mid/bass driver magnet, meanwhile, uses Scan-Speak's patented 'Symmetrical Drive' design. Here, three Faraday rings fix to the magnet, reducing inductance modulation, minimising second harmonic distortion, and decreasing DC offset at the voice coil (which also reduces harmonic distortion). The 'SD-1' version used in this driver (other Scan-Speak drivers use different versions) also enables a narrower air gap between the voice coil and the magnet, resulting in higher flux intensity and lower magnetic reluctance in the circuit, thus increasing the motor system's efficiency. The driver's chassis is made from diecast aluminium, with venting below its spider suspension to eliminate the compression effects that can affect performance if no venting is present.

Although the Revelator has a rated diameter of 150mm, this is a 'nominal' dimension. The basket's total diameter is actually only 148mm, while that of the driver's moving part is only 125mm. The cone's diameter is less again — just 98mm. But the Thiele-Small diameter is the important specification here as it determines the effective piston area (Sd), and my tape measure put this at 110mm, giving an Sd of 95cm². Lastly, the cone is driven by a two-layer voice coil 38mm in diameter.

Serhan Swift has chosen another driver from Scan Speak's top-line Revelator range for the mµ2 Mk II's high-frequency unit (tweeter). It too is instantly recognisable as a Scan-Speak driver,

Right: That distinctive phase plug prevents the centre of the ring radiator from moving. High frequencies are instead created by two ring-shaped diaphragm sections moving, with their smaller 'rolls' meaning that any resonances are moved beyond audible levels.

due to its 'ring radiator' design combined with the unique shape of its central phase plug. The ring radiator is, in essence, a dome radiator, but instead of the dome being anchored only at its periphery (the surround suspension), it has a fixed phase plug at its centre.

This phase plug addresses a problem that affects all soft dome tweeters. That is, that at high frequencies the very tip of the dome collapses inwards when the dome moves outwards into the room (due to air pressure), becoming convex rather than concave. When the dome heads back towards the speaker cabinet, it becomes convex again. The release of energy that occurs as the dome tip 'snaps' between the two different shapes results in resonance. This is one of the reasons why some driver manufacturers use tweeter domes made of metal, the idea being to make the dome so stiff that it cannot collapse inwards — though this solution has problems of its own that are too numerous and technical to go into in the space I have to write this review!

In a ring radiator design, such as the Revelator R2904/7000000 model used in the mμ2 Mk II, the central fixed phase plug (which, in case you were wondering, is that very obvious spike at the tweeter's centre) prevents the centre of the ring radiator from moving, with the high frequencies created instead by two ring-shaped diaphragm sections moving. The smaller 'rolls' of these two rings mean that any potential resonances are moved to a high frequency beyond the range of human hearing.

However, there is another advantage to using a ring radiator tweeter over an ordinary dome design — and it's more related to performance than most manufacturers would like you to believe: driver-to-driver consistency. A tweeter's manufacturing process is so complex that it's extremely difficult to ensure one unit is the same as the next — that the hundredth tweeter coming off the production line is identical to the first (and the second, and the third…).

Why? Because loudspeakers are electromechanical devices, it is very easy for there to be variations between them. There could be too much glue on one, too little on another, glue on one applied at a different temperature and/or humidity to that on another… not to mention batch-to-batch variations in the glue itself. While they might sound subtle, these differences will affect a tweeter's frequency response, distortion, dispersion… every aspect of its performance really! The beauty of the ring radiator design is that, on the whole, its performance is slightly less sensitive to variances introduced during the manufacturing process compared to a traditional dome design.

The mμ2 Mk II's crossover network uses pair-matched Solen capacitors and air-cored inductors. In the case of the latter, each is measured individually and then, if necessary, custom-trimmed to ensure the correct inductance. The network's design is said to be a Linkwitz-Riley fourth-order electroacoustic, achieved by using a second-order slope for the mid/bass driver and a third-order for the tweeter. Serhan Swift is a little coy about specifying the exact crossover frequency, with Swift saying: "We don't want to be too specific because the acoustic crossover will depend on whether you're listening on-axis or off-axis (horizontally), and whether your ears are above the tweeter axis or below it (vertically)." He did, however, state that the electronic crossover frequency was "in the high 2s". (*Newport Test Labs*' measurements tell us its best guess was 2.65kHz.)

As you can see from the image at the top of this page, the mμ2 Mk II is a bass-reflex design, the port exiting through the rear panel. The port is 100mm in length, 42mm in diameter and made entirely of super-smooth ABS (many are part-ABS, part-cardboard).

Each mμ2 Mk II cabinet has specified dimensions of 322 x 180 x 236mm (HWD), though speaker grilles at the front and protruding speaker terminals at the rear take actual depth to 277mm. You'll need to allow for a little more depth if you're planning on inserting banana plugs into the speaker terminals (rather than bare wire or spades), too.

The cabinets aren't just your typical MDF affairs, either: they're made out of a sandwich of birch-ply, MDF and custom damping materials developed and designed by none other than Les Davis, the man behind the audio isolation device company that bears his name, and the developer of the Entropic Isolator.

Made by Cardas Audio, the speaker terminals are very high-quality, manufactured from high-purity copper bar stock that is then plated with a silver/rhodium amalgam.

And what about the ID plate that sits above those terminals and bears two signatures? It's attached only after a rigorous build process that involves both designers personally. The company says: "Each pair of mμ2 Mk II takes 3 days from start to finish under the watchful eyes of Chief Loudspeaker Designer Brad Serhan and Engineering Director Morris Swift. Brad performs final testing and then he and Morris proudly sign each unit."

IN USE AND LISTENING SESSIONS

Though you could, of course, position the mμ2 Mk II on a shelf or side table, they are designed for standmounting. Serhan Swift doesn't actually manufacture a matching speaker stand, but it does recommend one — the Italian-made

Right: The mid/bass driver is easily recognisable as a Scan-Speak Revelator due to the distinctive appearance of the 'sliced cone', which has grooves sliced into its paper surface in an effort to keep its break-up modes under tight control.

SolidSteel SS6, designed by Moreno Conti which, as you can above, is a tripod design comprised of three tubular supports and crimped steel bar stabilisers. The stainless steel spikes at the base of the tubes are removable to allow the frame to be filled with your choice of damping material (if deemed necessary). The top plate is decoupled using steel ball bearings. The height of each SolidSteel SS6 stand is around 625mm, putting the mounted mμ2 Mk II's tweeters nicely at around the ear level of seated listeners.

I haven't mentioned it until now, but what you might have already noticed from looking at the images is that the mμ2 Mk II speakers are mirror-imaged — on one speaker, the tweeter is above and to the right of the mid/bass driver; on the other, it's above and to the left. So which is the left-channel speaker and which is the right?

If you're looking for a definitive answer, you'll be disappointed because there isn't one. Which way round you put them all depends on how far apart they are placed relative to the listening position, and how far your listening position is from the speakers' plane. As a general rule, if the speakers are relatively close to one another and you are also relatively close to them, the tweeters should be outer-most. If the speakers are further apart and you're listening from a greater distance, the tweeters should be on the inside. Curiously, if you move even further away, you should revert to the outer-most tweeter option. Unfortunately, even this rough guideline will be affected by the proximity of side walls and large furniture items, so it's really just a case of trying both configurations and choosing the one that delivers the best stereo image at the listening position.

My only advice when you're doing this is that you position the speakers very slightly off-axis from your listening position, as I found this resulted in the best sound quality. As with all small bookshelf/standmount designs, bass levels and extension will increase if you position the mμ2 Mk II close to a rear wall.

Perhaps the greatest accolade one can bestow on any pair of loudspeakers is that they do what they're supposed to do effortlessly, and I found this to be true of the mμ2 Mk II — music just seemed to flow from them organically. When listening to them, I wasn't thinking about a signal source delivering the music… or the interconnects, amplification and cables involved as well. Indeed I forgot about the mμ2 Mk II too — I was just listening to the music! When a loudspeaker has this effect on you, particularly in the high-pressure environment of testing and review writing, you know it's special.

This skill of effortlessly delivering music that the Serhan Swift mμ2 Mk II show off so well made me *very* tempted to cut short my usual listening sessions and just write up a review conclusion basically saying: 'You'll know what I am talking about the instant you hear a pair for yourself'. But I'm led to understand that many readers might feel a little shortchanged if I took such a straight and narrow path. So here goes a more comprehensive effort that meanders a little before it arrives at its final destination…

My first recommendation is that you start your listening session by playing instrumentally sparse music, with just a single vocalist accompanied by one or two instruments, preferably recorded as naturally as possible. My first candidate matching that was Michelle Shocked's very first album, 'The Texas Campfire Tapes'. You wouldn't necessarily choose this album for its recording quality because it was, literally, recorded outdoors, around a campfire in Texas at night… using a Sony Walkman cassette recorder. Despite this — or perhaps because of it — the sound is very real, not least that of those damn crickets in the background!

Although the mμ2 Mk II delivered Shocked's voice with the utmost realism, what truly shocked me (sorry!) was their ability to reveal the movement of the Walkman during the recording as well as when Shocked moved her mouth or her guitar whilst performing. One obvious example is when she sings '*I'm living alone now*' in the opening track *5A.M. in Amsterdam*, but the album is replete with examples of both revelations.

The Secret Admirer is a notable track mainly because you can instantly hear how Shocked had tweaked the tuning on her guitar from the previous track, during which it went slightly out of tune. The realism of the fret noises on *Down on Thomas Street* is delivered perfectly by the Serhan Swift, as are the sounds of her tapping the body of her guitar. Needless to say, the tonal quality of her acoustic guitar is perfect. You can also tell that she isn't exactly in the backwoods by the regular sound of motor vehicles in the

The piano sounded full of depth… and tonally rich (including overtones) across the entire keyboard span

background — again, beautifully delivered by the mµ2 Mk II!

One issue with super-transparent speakers that are capable of revealing the tiniest details is that sometimes you don't really want to hear them! Very occasionally, I was hearing the effect of tape flutter when Shocked played higher on the fret board, perhaps most noticeably on *Goodnight Irene* due its slower tempo. Thankfully, it was not so noticeable that it detracted from my enjoyment, and as most of the tracks are fairly up-tempo (not least her terrific take on Paul Simon's *Stranded in a Limousine*), I didn't hear the effect all that often.

Firing up an album with real production values proved that the Serhan Swift mµ2 Mk II's do super-smooth with panache. 'Big Time', Angel Olsen's sixth studio album and her first real foray into country, is nothing if not lusciously smooth, and listening via the mµ2 Mk II was revelatory, whether we're talking the achingly beautiful sound of the lap steel guitar on *All the Good Times*, the pedal steel on *Dream Thing* and *This is How it Works*, or the organ, harpsichord and clavichord (all played by Drew Erickson) on those and other tracks. Olsen's voice is so fantastic that she really didn't need it to be drenched in reverb, but it really works well on this album and was very tastefully delivered by the mµ2 Mk II.

They do what they're supposed to do effortlessly… music just seemed to flow from them organically

Erickson also plays the piano on many of this album's tracks, but it's a particular feature on the second-best track (*Chasing the Sun*), and the one which provided my first real opportunity to hear how well the mµ2 Mk II delivered the sound of a piano, which is often held to be the most difficult instrument for loudspeakers to reproduce. The instrument certainly posed no difficulties for the Serhan Swifts — the piano sounded full of depth, particularly in the bottom octaves, and tonally rich (including overtones) across the entire keyboard span. The sonic decay of the sustained strings was a lesson in level accuracy, too.

So good it was that I switched to auditioning solo piano, first with Simone Dinnerstein playing possibly my favourite long-form musical work, J.S. Bach's 'Goldberg Variations'. Normally, I'd listen to Glenn Gould's version from 1984, my favourite version of this work, but Dinnerstein's version is excellent, and the sound (and tuning) of her piano is way better than that of the one Gould uses for his performance (his much-abused Steinway CD 138, if I recall rightly).

The recording quality on Dinnerstein's version is also better due to the involvement of Grammy award-winning producer Adam Abeshouse, the backing of Telarc, and the fact that it was recorded in the fabulous-sounding auditorium of the Academy of Arts and Letters in New York, on its newly restored (by Klavierhaus) 1903 Hamburg Steinway Model D concert grand (you can't beat the Steinways that were built in Germany… these days, many are not!)

It's not only Dinnerstein's pianism I admire when listening to the Goldbergs, I also like the way she takes liberties with the score (like Gould), repeating some variations and not others, and sometimes only part of a variation. She also follows in Gould's shadow when playing repeats, playing first *legato*, and then *staccato* (or *vice versa*), plus her ornamentation is both pretty and varied as well as ultra-precise. She doesn't, however, give the 'lilt' to the canons that Gould manages to incorporate. (If you don't think you've heard 'Goldberg Variations', you have if you've seen 'The Silence of the Lambs', which features the *Aria* forming the basis for the entire work).

I must recount a horrible experience regarding Bach that I had recently. My all-time favourite work of his is the *Gigue* from his *French Suite No. 5 in G major,* and the version I most like is by Susan Hammond from her album 'Mr Bach Comes to Call' (supposedly for children, but everyone should own a copy; you can listen to Part 1 via *YouTube*.) Well, my horrible experience was hearing this work as played by a computer (MIDI, in other words) — it was excruciatingly bad. Hear how bad [it's on *Wikipedia*], then listen to Hammond's version — even if it is on *YouTube*: It's proof positive that AI isn't going to take over in the music world!

But back to the mµ2 Mk II, if only to say that if you turn the volume up a bit, you will forget you're listening to a recording and will be instead enjoying a live piano rendition in your listening room. Speaking of volume increasing, you will need to ensure your amplifier is sufficiently powerful to drive the mµ2 Mk II to your preferred listening levels without clipping, because my speakers are inefficient (86dBSPL/w/m) and it was immediately obvious (from me having to turn the volume on my preamp much higher than I would with my own speakers) that these Serhan Swifts are even less efficient. That said, I only have 100 watts per channel at my disposal at present and that proved more than enough power to put the mµ2 Mk II on song.

Updating the piano music to this century, I played Alicia Keys' album 'Songs in A Minor', which adds considerable instrumentation. Get past *Piano & I* and play *Girlfriend,* and you'll quickly hear that, despite their modest size, the mµ2 Mk II can crank out quite a bit of deep bass — more, I'd imagine, than most listeners will be able to use,

particularly those with modestly sized listening rooms (room size is the primary limiting factor for bass reproduction due to the long wavelengths of bass frequencies, though these days I'd venture that the primary limiting factor on deep low-end is more likely to be the sensibilities of your neighbours!).

The album's big hit was, of course, *Fallin',* which the mμ2 Mk II deliver beautifully, from the synth bass to the piano, organ, choir and, of course Keys' own vocals, whether she's singing the lead or being her own back-up singer. This track also reveals the speakers' soundstaging ability, which is second to none, in part due to the insanely high quality of the drivers. The same is true of the stereo imaging — it's extraordinarily good, again partly because of those drivers but also down to the superb quality of the mμ2 Mk II's crossover network, with its Solen hand-trimmed air-cored inductors, polypropylene capacitors and non-inductive resistors.

To see how well the mμ2 Mk II could deliver the sound of a male vocalist, I turned to Patrick Walker's album 'Perfect Light' (on which he refers to himself as '40-Watt Sun'), and once again the speakers were spot-on, particularly in the highest frequencies. The cymbal sound is 'just right'. Sticking with male vocals but going for something heavier, I reckoned it was time for last year's *tour-de-force* from the Arctic Monkeys: 'The Car'. There are those cymbals again, but just listen to that glorious string quartet — that is, if you can tear yourself away from the poetry of the lyrics. *Sculptures of Anything Goes* is another perfect demonstrator of these speakers' ability to render deep and depthy bass without even a hint of overhang or doubling.

Great bass is also a feature of Camp Cope's best album to date, 'Running With The Hurricane', on which the Melbournian trio is helped out by Cable Ties' Courtney Barnett and Shauna Boyle. Kelly-Dawn Hellmrich's inventive bass lines are front and centre throughout, and a perfect counterpoint to Georgia 'Georgia Mac' McDonald's vocals (just listen to her scatting on the title track) and Sarah Thompson's snappy drumming (… more great cymbal sound!).

CONCLUSION

A well-known and highly credentialed reviewer of my acquaintance once told me how long it takes him to establish whether the loudspeakers he's been sent for review are exceptional or just another competent design. 'About sixty seconds,' he told me. So trust me when I tell you that it will probably take you that length of time when auditioning the mμ2 Mk II to realise you are listening to an exceptional-sounding pair of speakers — one that is exceptionally detailed, exceptionally flat across the midrange and highs, and has exceptionally low distortion and exceptionally precise imaging and soundstaging.

For me, every one of those uses of 'exceptional' is deserved, but in the end, the true beauty of Serhan Swift's newest loudspeakers is that they do what they're supposed to do so effortlessly; that music just seems to flow from them organically. ***Greg Borrowman***

TECH SPECS & CONTACT

Brand: Serhan Swift
Model: mμ2 Mk II
RRP: $7,500 per pair
Warranty: Five Years
Design: Two-way bass-reflex
Frequency Response: 45Hz–30kHz
Sensitivity: 84dBSPL/1m/2.83V
Nominal Impedance: 6Ω
Tweeter: Scan-Speak 25mm Revelator Ring Radiator
Mid/bass driver: Scan-Speak 25cm Revelator
Dimensions (HWD): 32.2 x 18 x 23.6cm
Weight: 7.8kg
Finishes: Black or white

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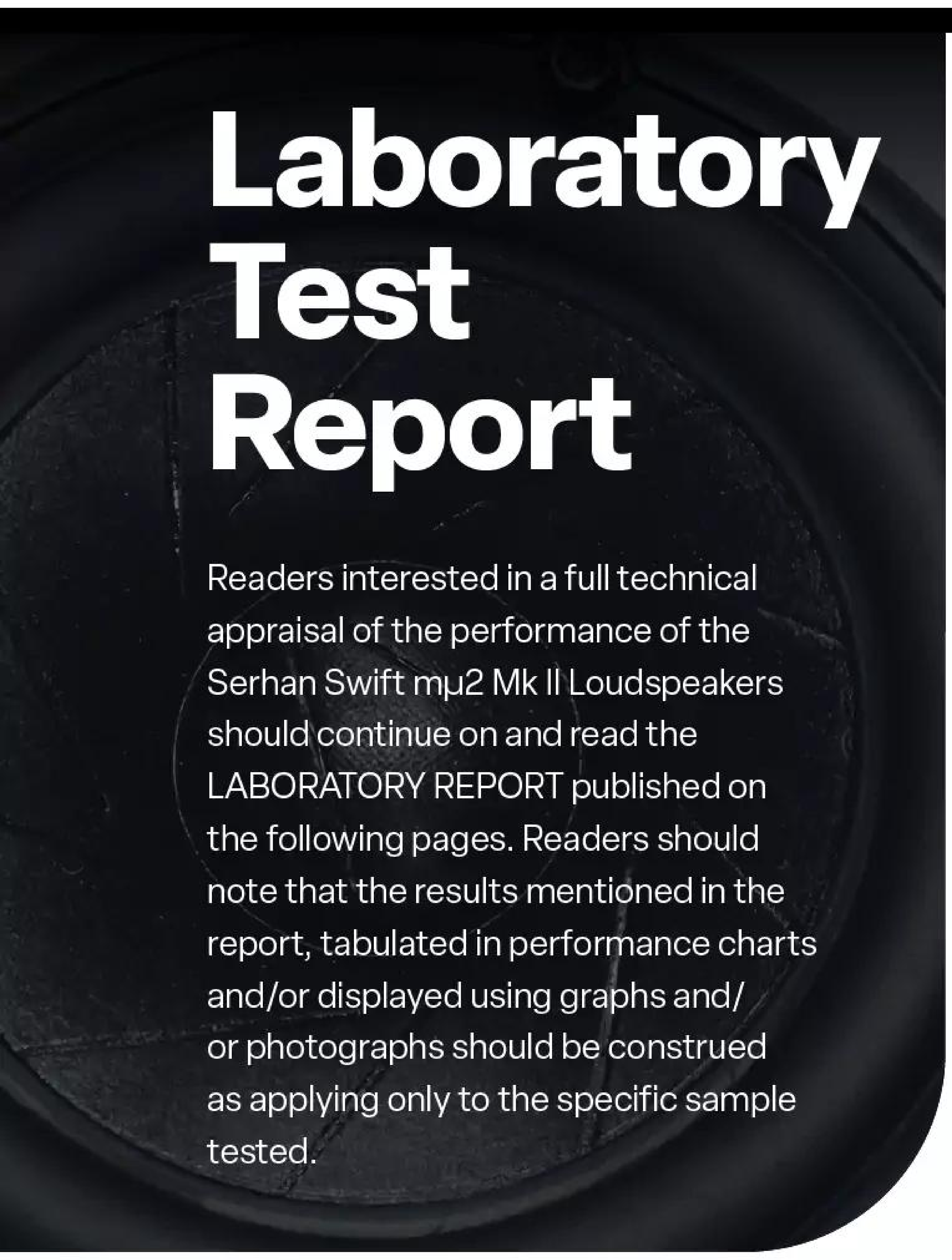


Laboratory Test Report

Readers interested in a full technical appraisal of the performance of the Serhan Swift mμ2 Mk II Loudspeakers should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

Graph 1 shows the in-room response measured by *Newport Test Labs*, with the speaker placed well clear of all boundaries so that there wouldn't be any boundary-induced reinforcement of low frequencies. The trace is the averaged result of nine frequency response measurements, made with the microphone positioned at nine different points in front of the speaker, with the central point on-axis with the tweeter. All responses were obtained using pink noise as the stimulus.

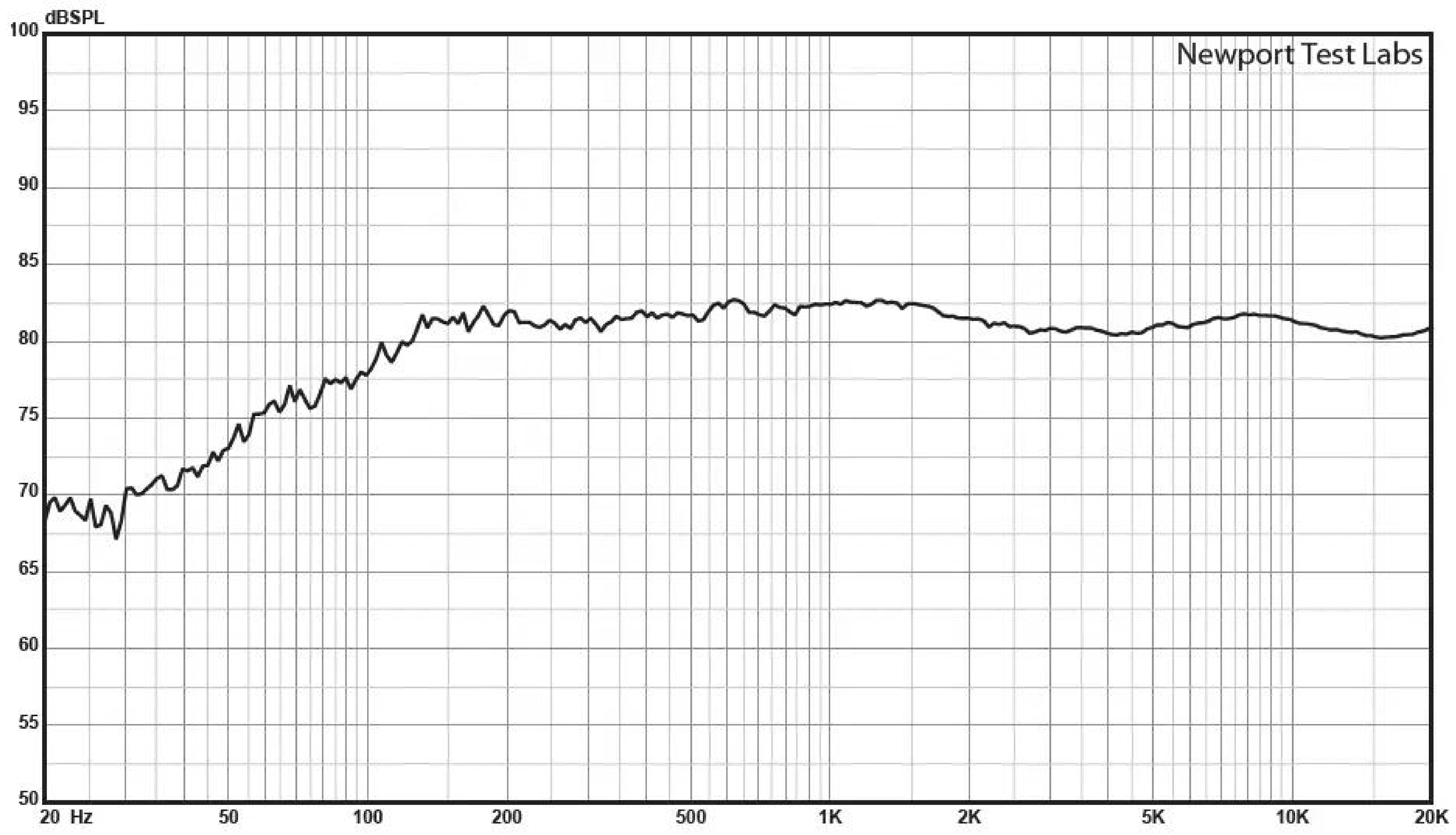
You can see that above the low-frequency roll-off (which is the inevitable result of the absence of boundary reinforcement and the relatively small size of the mid/bass driver and cabinet), the frequency response of the Serhan Swift mμ2 Mk II extended from 70Hz to 20kHz ±3dB. You should note that this upper limit is the graphing limit and *not* that of the speaker itself — its response extends well above 20kHz, as shown in Graph 2.

Very importantly, as you can see from the first graph, the response of the mμ2 Mk II above 120Hz was incredibly flat and linear, such that it was within ±1.25dB from 120Hz out to the graphing limit of 20kHz. Also, there is no 'skew' to the response — it's remarkably uniform, the only obvious discrepancy being a slight dip between 1.5kHz and 8kHz, where the response drops from +1.25dB to –1.25dB before rising again.

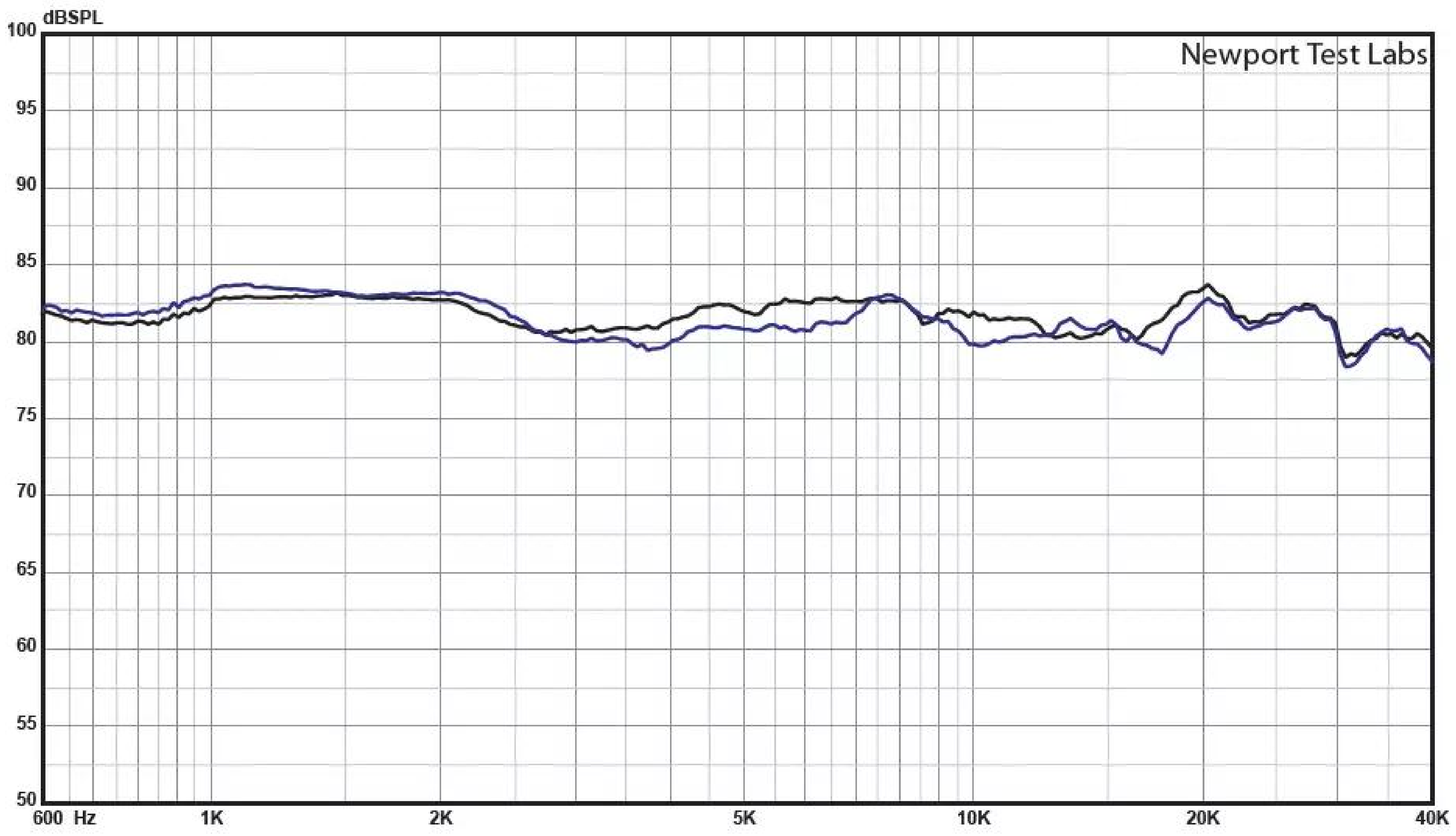
A more extended and detailed measurement of the mμ2 MkII's high-frequency response is shown in Graph 2, both for when the front grille is fitted (blue trace) and when no grille is present (black trace). The first thing to note here is that the grille is essentially acoustically transparent, so it's unlikely you could hear any differences in sound that were the result of using (or not using) the grille. I would recommend using it at all times. The second thing to note is that the frequency response of the Scan-Speak ring radiator tweeter extends within the same ±1.25dB window right out to 30kHz, after which it drops off in level very, very slightly but is still easily within the ±3dB window, putting the response measured by *Newport Test Labs* at 70Hz to 36kHz ±3dB. Note that although the measurement microphone was on the horizontal tweeter axis, it was 15 degrees below the vertical axis (see Graph 3).

Newport Test Labs' measurements of horizontal on-axis and off-axis measurements showed that the tweeter's response directly on-axis was very slightly higher than it was if measured from 15 degrees below axis, which is the trace shown in Graph 2 (and Graph 6). This response is shown in pink on Graph 3. The 15-degree, horizontal off-axis response is shown as the black trace on Graph 3, and it's excellent, roughly similar to the 15-degree below-axis response. The 30-degree off-axis response is very close to the 15-degree off-axis response right out to 20kHz — the significant dip in the 30-degree off-axis response starts only above 20kHz, above the limit of human hearing.

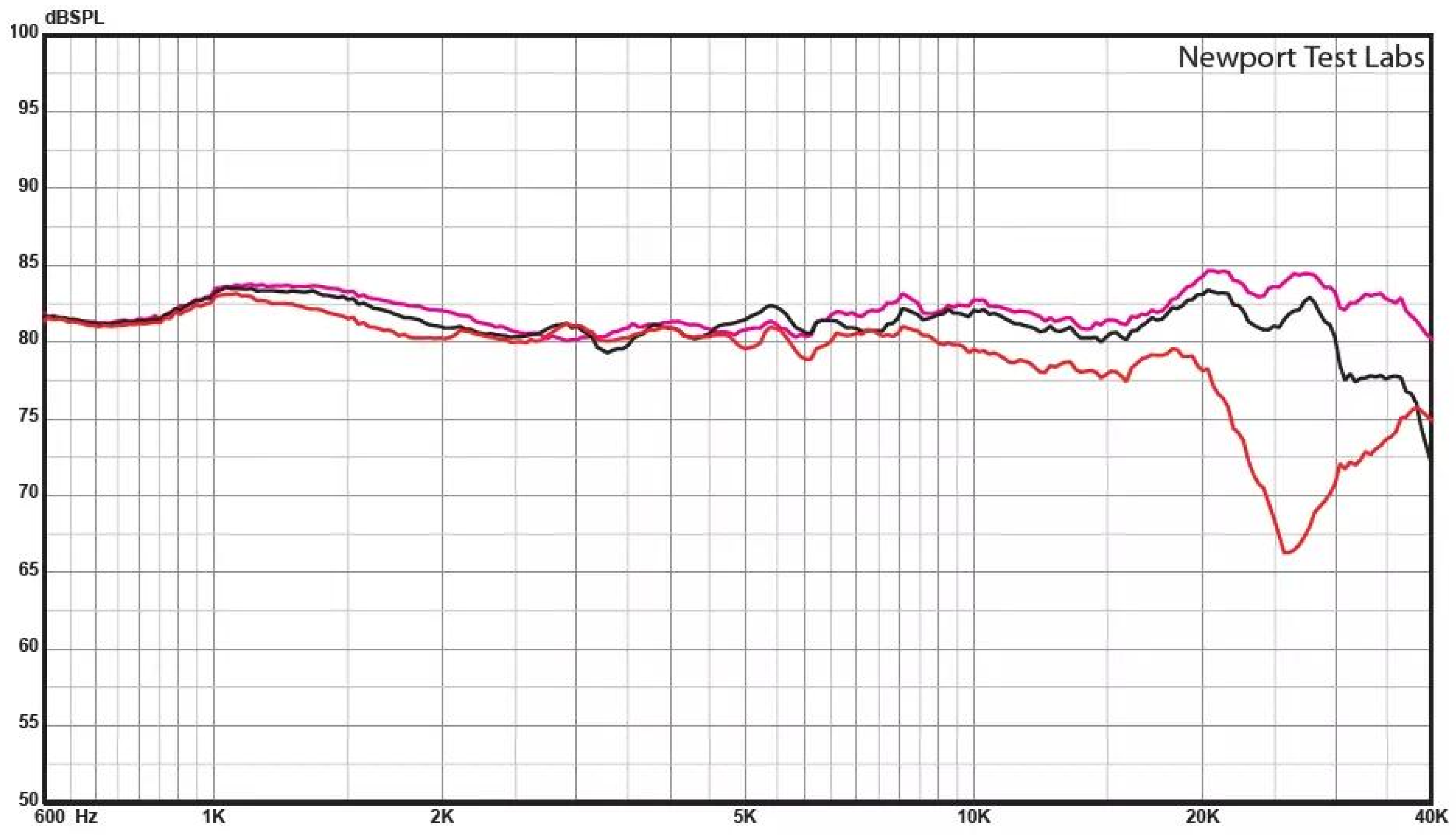
The mμ2 Mk II's low-frequency response is shown in Graph 4, measured using a near-field technique that simulates the response that would be obtained in an anechoic chamber.



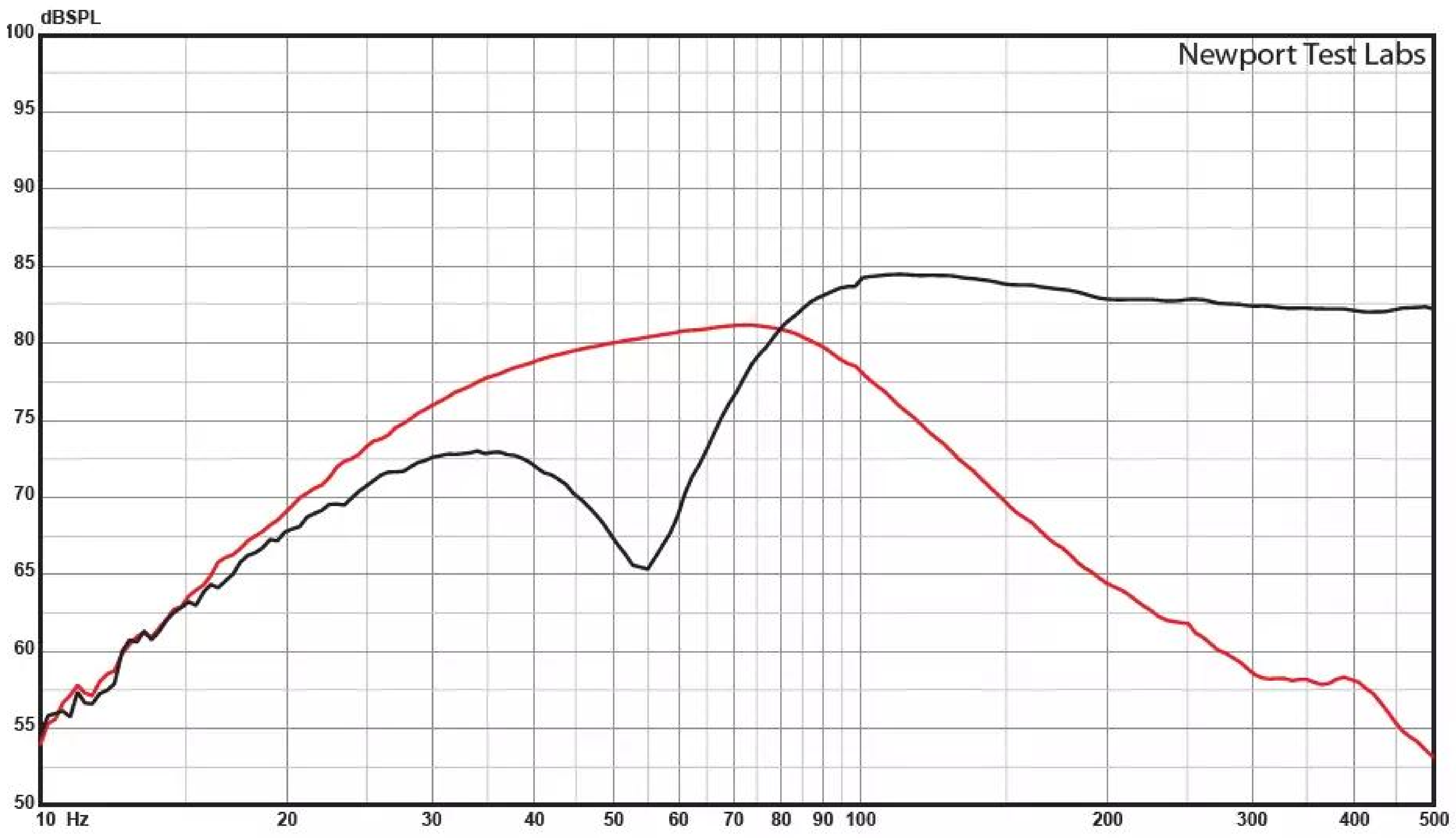
Graph 1. Frequency response (in-room), averaged over nine points with the tweeter on-axis response at the centre of grid.



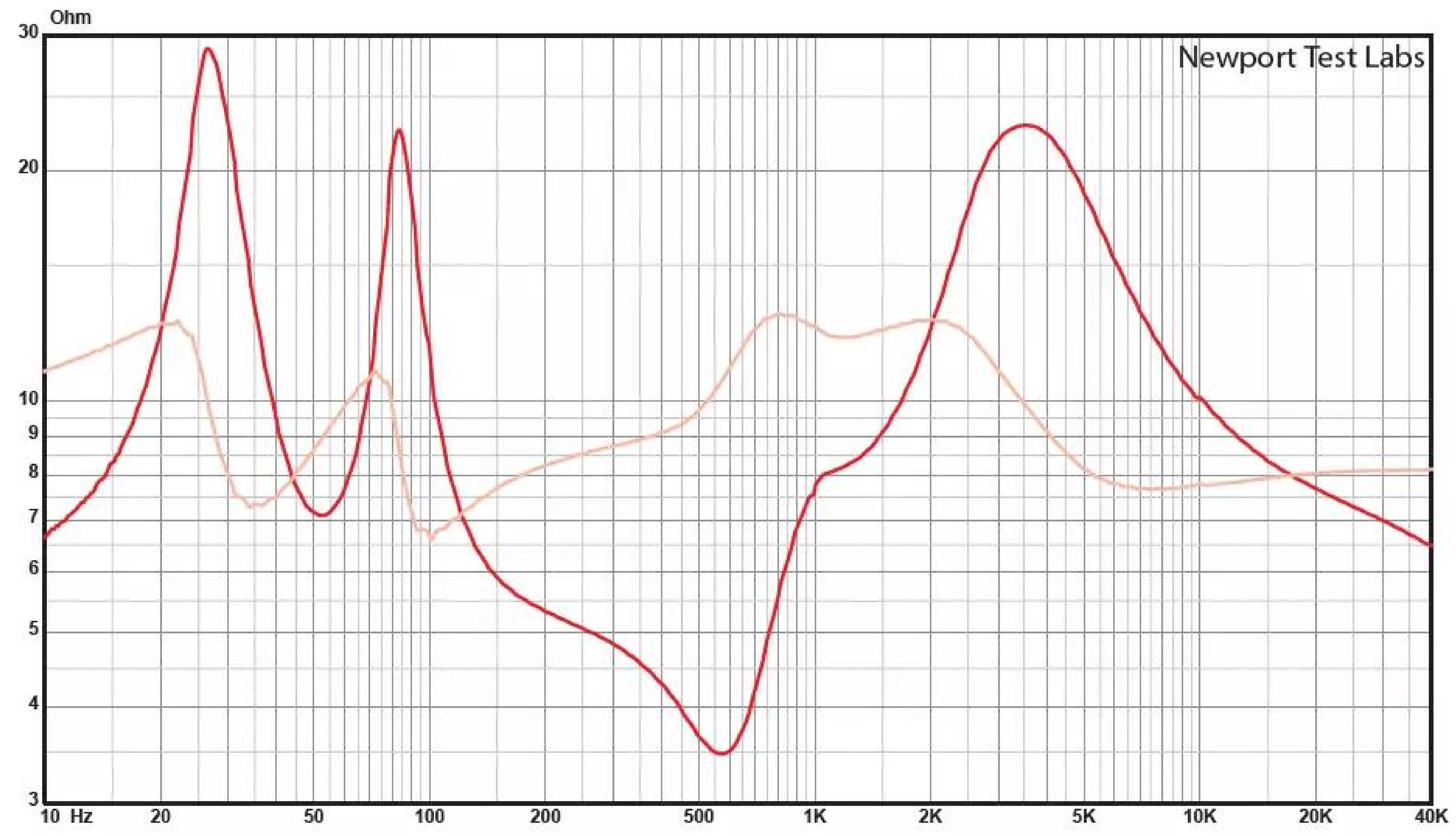
Graph 2. High-frequency response, 15 degrees off-axis vertical, grille off (black trace) vs. grille on (blue trace).



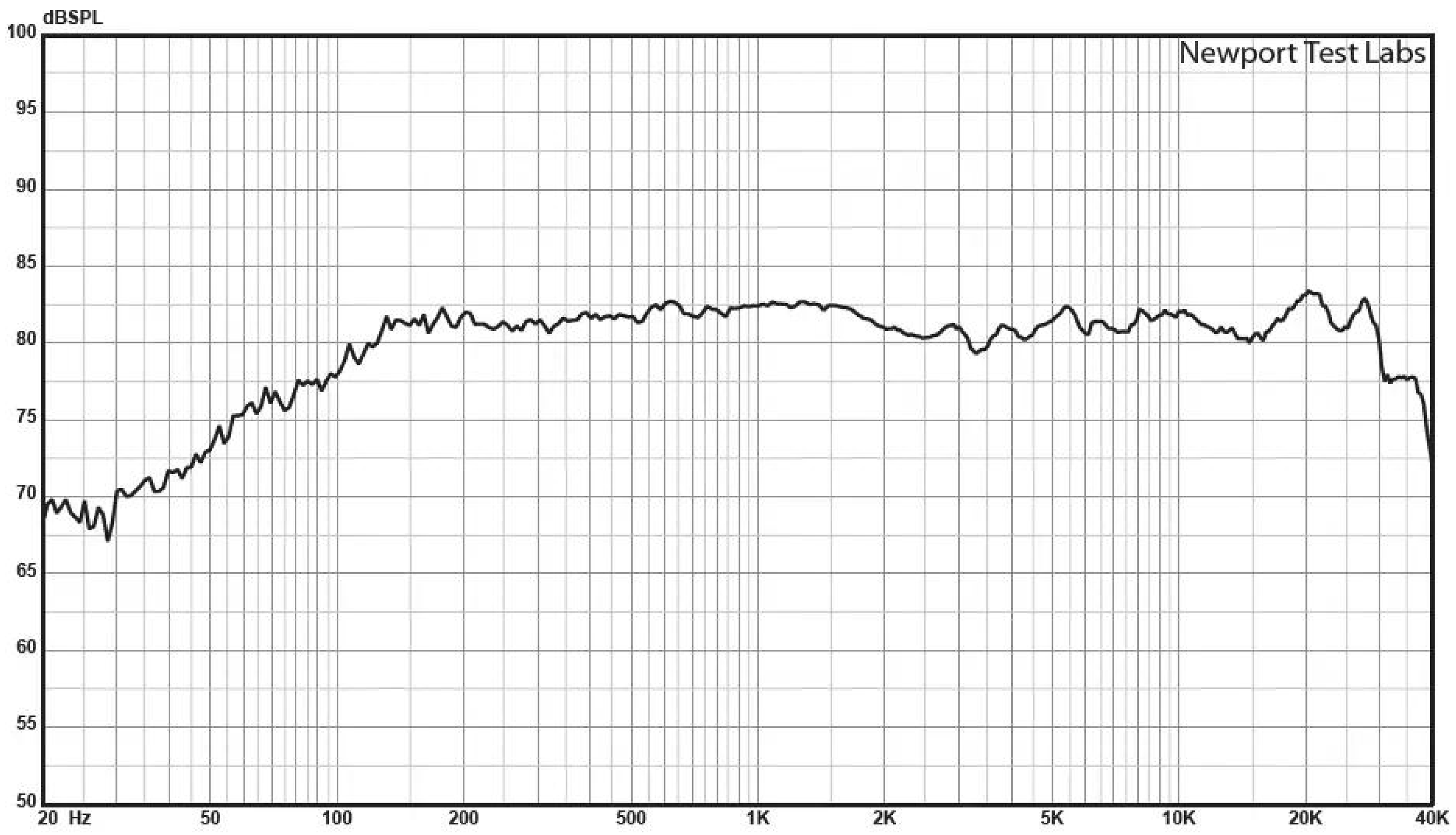
Graph 3. High-frequency response on-axis (pink), 15 degrees off-axis (black), 30 degrees off-axis (orange).



Graph 4. Low-frequency response (near-field) of mid/bass driver (black trace) and reflex port (red trace).



Graph 5. Impedance (red trace) and phase angle (orange trace).



Graph 6. Frequency response at one metre, microphone 15 degrees below the tweeter axis.

You can see that the response of the mid/bass driver (black trace) is very linear above 100Hz but rolls off at the predicted rate for a bass reflex alignment below 100Hz, to a minimum at 55Hz. The response of the reflex port (orange trace) is quite unusual, in that its peak output is not at 55Hz, as one would normally expect, but around 75Hz. The port also delivers significant output over a much wider bandwidth than I would normally expect, leading me to believe that the mµ2 Mk II's cabinet alignment has been designed more by ear than by the textbook!

The modulus of the mµ2 Mk II's impedance is shown in Graph 5, and you can see the classic 'camel's hump' of a bass reflex alignment in the trace, with the lower hump peaking at 27Hz and the upper at 83Hz, with the 'saddle' at 52.5Hz. This 'saddle' frequency indicates that you shouldn't expect significant levels of bass below it. You can see that the impedance is mostly very comfortably above eight ohms across most of the audio band, but dips below six ohms between 150Hz and 8.2kHz, and is just 3.5 ohms at 575Hz. This puts the mµ2 Mk II's 'nominal' impedance at four ohms (according to International Electrotechnical Committee guidelines, at least), rather than the six ohms claimed by Serhan Swift. The phase angle is nicely controlled, meaning this speaker will be an easy load for any amplifier, though one with some power behind it would be helpful, about which more in a moment.

Graph 6 shows a composite frequency response, where *Newport Test Labs* has used post-processing to splice the in-room low-frequency response to the anechoic high-frequency response to show an overall measured response for the Serhan Swift mµ2 Mk II of 70Hz to 36kHz ±3dB. Owners will be able to extend the bass response of their mµ2 Mk II by moving them closer to a boundary, such as a rear wall, which is no doubt how Serhan Swift obtained its low-frequency specification of 45Hz.

Newport Test Labs measured the sensitivity of the mµ2 Mk II using its usual stringent methodology and reported a result of 83dBSPL at a distance of one metre, using an input of 2.83Veq. This is a very low figure — yet one that's very close to Serhan Swift's own specification of 84dBSPL — and means the design is quite inefficient at turning electrical power into acoustical power. Because of this, I'd advise using a relatively powerful (at least 60 watts per channel) amplifier to drive the speakers, even if you are using them in a small-to-medium-sized room and even if you plan on listening to them at modest volume levels. ***Steve Holding***

The Compact Cassette revolutionised portable audio and mainstreamed for nearly 40 years.

The (R)evolution of Portable Audio – Part 3

Tape goes 'compact'

Billions of them were made. They'd fly to the moon, frustrate home computer users and launch the original mixtape. Darren Yates looks back at the rough-and-tumble story of the audio cassette...

Dutch engineer Lou Ottens isn't a household name, but he should be. Reel-to-reel tape recorders were fast becoming commodity items by the early 1960s, and while the transistor had been responsible for new portable designs, the tape system itself still required the dexterity of a surgeon, as users navigated lacing the tape around pinch-rollers, guides and heads. Efforts to encase the tape reels into a simple snap-load cartridge system weren't new, but it would eventually take two technology giants playing 'hardball' to get Ottens' new technology its place in history.

Musical chairs

Work on an audio cassette began in the '50s, with the huge Radio Corporation of America (RCA) releasing the 'Sound Tape Cartridge' in 1958. However, despite its clear convenience over reel-to-reel tape, the format disappeared six years later. Suggested reasons for its failure vary, but RCA's slowness to release pre-recorded music tapes and domestic players is often cited.

Meanwhile in Europe, German maker Grundig was the market goliath in tape recorders and, in 1961, reportedly partnered with Dutch giant Philips to create an audio cassette. The problem for Grundig was that Philips also had its Belgian team (including engineer Lou Ottens) working on an alternative design. Indeed, Ottens' 'Pocket Recorder' design eventually won out, leaving Grundig's joint effort out in the cold. Despite Philips' offer to Grundig to join its 'Pocket Recorder' group, Grundig was having none of it and instead released the rival music-focused 'DC-International' cassette with fellow German maker Telefunken in 1965. However, it failed to catch on; by 1968 it was gone.

RCA and Grundig essentially missed the bus — the former let slip its first-to-market opportunity while the latter was just too late. Philips, with Ottens' renamed 'Compact Cassette', won the market, though a high-stakes battle with Japanese heavyweight Sony would ultimately see it win a hollow victory.

The 1963 Berlin IFA Exhibition

Some 28 years after AEG demonstrated its 'Magnetophon' reel-to-reel tape recorder at the Berlin Radio Show, Philips arrived with its 'Pocket Recorder' in August 1963. The reception was reportedly muted, though it's suggested that Japanese manufacturers at the show were impressed. As RCA was finding out (and tech brands still learn years later), creating a global media format on your own is a hard slog! Still, Philips no doubt hoped its cassette format would become a stream of ever-flowing royalties from other hardware makers. It was, however, well aware that if it was to win the market, it needed the fast-growing Japanese makers onboard, starting with Sony.

This time, though, Grundig got to Sony first. The Sony team weighed up both the Pocket Recorder and DC-International proposals... but chose the smaller Philips unit. Philips may now have anticipated an easy win and came at Sony with a 25-yen (seven US cents in 1965) per-unit-sold royalty contract. Sony's response was effectively 'yeah, nah', expecting Philips to go away and sharpen the pencil. Philips obliged soon afterward but dropped the royalty a whopping 75% to just six yen per unit.

Sony must have sensed the tide was turning in its favour, for it now demanded Philips either drop its royalties completely, or it would choose Grundig. For Philips, this must have come as a shock — either it now caved in to Sony and forgot about the royalties altogether, or it stuck to its guns and fought a united Sony-Grundig front for the cassette market. In the end, Philips dropped the royalties but ensured Sony didn't get exclusive rights.

As for Grundig, it lost out in the middle of the Sony-Philips battle — by 1966, Japanese manufacturers were churning out cassettes and recorders by the bushel, and by the following year the recently renamed 'Compact Cassette' had won. However, the Sony fight had cost Philips all hope of royalties.

When the dust settled, the real winner to emerge was Sony.

The Commodore 'Datasette' stored programs from the PET, VIC-20 and 64 computers on cassette (Image credit: Public Domain).

Image credit: RFWilmut, CC-BY-SA 3.

Fly me to the moon

Meanwhile, Sony continued with its healthy business of making and selling tape recorders and cassettes. One of those recorders was a 1968 design that could be operated in one hand. NASA saw it and thought it could be a great way for Apollo astronauts to record mission log notes. The result was the Sony TC-50, the first 'notetaker' cassette recorder, hitching a ride on every mission, beginning with Apollo 7 and orbiting the moon on Apollo 10. In a twist, it's likely the Apollo missions also invented the mixtape, as each astronaut carried tapes containing their favourite music.

How the Compact Cassette improved

Despite all this, however, the original '60s' Compact Cassette wasn't well suited to music — it was originally meant for voice recording. In simple terms, early Compact Cassette recorders were better than analog AM radio but not as good as an analog FM receiver.

Even by 1960, it was understood that high-fidelity audio needed tape that was as wide as possible, running as fast as commercially viable. Music tapes in the '60s (including the popular American '8-track' system) delivered two-channel stereo sound on 6.35mm (0.25 inch)-wide tape with a play speed of 9.5cm/second (3.75 inches). The Compact Cassette tape, however, was just 3.175mm (an eighth of an inch) wide, had a play speed of 4.75cm/second (1.875 inches) and was single-channel only. With half the width, tape hiss (affecting 'signal to noise ratio', or SNR) was much more noticeable, and at half the speed the frequency response was considerably lower. But with these specs baked into the Compact Cassette standard, what could be done?

It became a technological battle on multiple fronts. The first cassettes used Ferric-Oxide

Grundig's DC-International cassette was a brief competitor during the mid-60s (Image credit: Ulrich Miemietz, CC BY-SA 3.0).

The Sony Elcaset had potential but arrived five years too late (Image credit: Akakage1962 & Retired electrician, CC BY 3.0).

The 1958 RCA Sound Tape Cartridge was the first serious attempt at an audio cassette (Image credit: Public Domain).

particles on PVC plastic tape, but in 1968 the U.S. chemical giant DuPont commercialised Chromium-Dioxide (CrO2) and the big German tape maker BASF created the first 'chrome' cassettes in 1970. These moderately improved SNR and frequency response.

Noise reduction — Dolby and dbx

The second step was electronic. Today, Dolby Atmos is a multi-channel audio processing system developed by Dolby Laboratories and found in everything from cinemas to phones. But back in 1965, Dolby Labs was just Ray Dolby, an electrical engineering graduate from Stanford and Cambridge universities who created a technology that would soon tackle the background-hiss problem.

Dolby worked out that our perception of background noise occurs in the higher frequencies rather than the lower ones. So he split the higher-frequency sounds into a separate stream (or 'band') and electronically increased the audio level of those frequencies while recording onto tape.

During playback, he just did the reverse, reducing those frequencies by the same amount, effectively returning the audio to its original levels. However, the difference was that on playback, the background hiss was also reduced by that same amount (this hiss wasn't increased or 'amplified' during recording because it is a function of the tape, not the audio signal). The result was a reduction in background noise by as much as 10dB (a bit over 3x) — and thus Dolby 'B' Noise Reduction was born.

But Dolby wasn't the only option. A more complex system known as 'dbx' was invented in 1971 by engineer David Blackmer. Whereas Dolby split the audio spectrum into different bands, dbx applied the 'companding' (compression-expanding) process to the whole audio spectrum. At its peak, dbx-encoded cassettes could achieve a near-Compact Disc SNR approaching 90dB. However, Dolby B-recorded tapes were still listenable without a proper decoder, whereas dbx tapes weren't — this helped Dolby B become the more popular commercial choice amongst record labels.

The cassette 'deck'

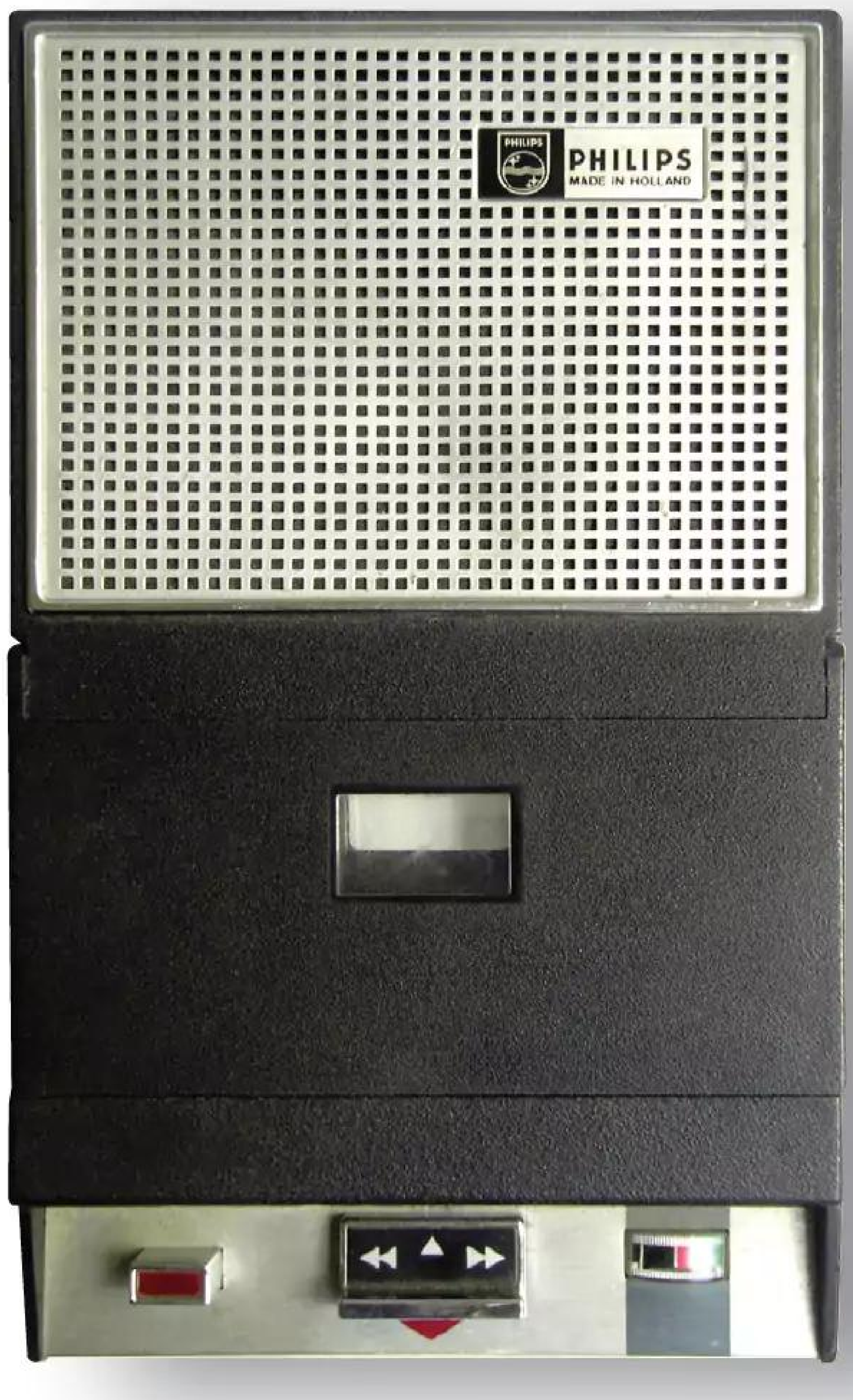
Nevertheless, this was all still just technology in 1971. Late-60s cassette recorders were predominantly shoebox-style units, like the original single-channel Philips EL-3300. The Advent 201 became the first stereo cassette deck to offer Dolby noise reduction and CrO2 tape support, glimpsing the Compact Cassette's future potential for high-fidelity audio.

In 1973, Japanese brand TEAC launched the A450 as the first reel-to-reel rival. It came with Dolby and CrO2 support, improved frequency response and lower 'wow and flutter' than the Advent. Because cassettes had a mechanical drive system, any variation in tape speed could be heard as either long, drawn-out 'wow' or fast, short 'flutter' changes in the audio pitch. While the Advent 201 achieved a decent wow-and-flutter figure of 0.15%, the tank-like A450 dropped this to just 0.07% — unheard of in

The Nakamichi Dragon, arguably the ultimate cassette deck, costs beyond $5,000 today (Image credit: Bbadgett, CC BY-SA 4.0).

cassettes in 1973.

However, that year, a well-respected but lesser-known Japanese audio company effectively said to TEAC 'hold my beer'. That company was Nakamichi. Born in 1948, Nakamichi was making cassette decks for brands including Harman-Kardon by 1970. In 1973, it began selling new decks under its own name. The first two, the Model 700 and Model 1000, combined Dolby and CrO2 support with a raft of new features, but they also added a new dimension. Nakamichi developed a new playback head, the electromechanical device that read the audio signal from the tape. Its key feature was a head gap (over which tape passes) much smaller than previously possible at just 0.7 microns (0.0007mm). This smaller gap delivered a much-improved frequency response: for the first time, the Compact Cassette could capture the audio spectrum right up to 20kHz. Move over, reel-to-reel.



The shoebox-style Philips EL3300 was the very first Compact Cassette recorder (Image credit: Erkaha, CC BY-SA 4.0).

One last hurrah: the Sony Elcaset

By 1967, the Compact Cassette had seen off RCA's Sound Tape Cartridge and the Grundig-Telefunken DC-International cassette. So it still seems odd for Sony to have had a dash at the cassette market itself nine years later.

The Sony 'Elcaset' (taken from L-casette or 'large cassette') was technically very good, albeit similar to the old RCA system, with twice the tape width and speed of the Compact Cassette. However, despite Sony's quality engineering, the Elcaset market barely lasted three years.

So what made Sony do it? There's no doubt that by 1971 the Compact Cassette was struggling to improve audio quality. Dolby B noise reduction improved the SNR aspect but couldn't solve the wider magnetic and mechanical issues. Sony wanted a cassette system to rival reel-to-reel and so built Elcaset for the job. Unfortunately, creating a new cassette system isn't something you did quickly and it's likely Sony hit the 'go' button near to Nakamichi launching the Model 1000. By the time the Elcaset arrived, Nakamichi had the Compact Cassette largely knocked into shape and Sony was left with a proprietary design about five years too late.

Still, it wasn't all bad for Sony — the Elcaset might have expired by 1979, but the Japanese giant was about to embark on a new brand that would enter technology folklore.

Yep, the Sony Walkman

While Nakamichi focused heavily on hi-fi, Sony was already known for portability, having produced a number of portable recorders during the 1970s. This culminated in 1979's legendary TC-D5, which was so good it was manufactured in various models for nearly 25 years and used by radio and TV journalists around the world.

One of its first users was Sony founder Masaru Ibuka, who favoured it as a travel companion. However, whilst it delivered near-studio quality in a portable, the TC-D5 was comparatively heavy. Deputy president Norio Ohga was tasked to come up with a stereo headphone-playback-only version of the company's recent TCM-100B 'Pressman' notetaker.

A combination of new electronics with the Pressman's sturdy tape mechanism, the iconic TPS-L2 hit Japanese store shelves in July 1979, just four months after the concept was sketched.

Compact cassettes featured in 1970s home computers, including the Commodore PET (Image credit: Parrot of Doom, CC BY-SA 4.0).

The Swiss-made Revox B215 rivalled the Nakamichi Dragon for audio quality (Image credit: Public Domain).

The Sony Walkman TPS-L2, as recommended by guardians throughout the galaxy (Image credit: Binarysequence, CC BY-SA 4.0).

Sony's TC-D5 is still mentioned in hushed tones by tape enthusiasts (Image credit: KnowledgeIsImportant, CC BY-SA 4.0).

Sony hoped to sell 5,000 a month… it sold 30,000-plus in the first two. And there you have it — the 'Walkman' was born. They appeared in music videos and movies. They rewrote pop culture and still do today. The TPS-L2 recently found a new generation of fans through Marvel's 'Guardians of the Galaxy' movie franchise, and now the going rate for a working TPS-L2 is typically $1,000 minimum.

Home computer storage

By the mid-70s, the cassette wasn't just for storing music but also computer code. The 'home computer' revolution started by the Commodore PET and Tandy TRS-80 in 1977 took advantage of audio cassettes as cheap data storage devices. In fact, cassette tape served as the storage medium of choice for many home computers, including the ZX Spectrum, Amstrad CPC464, and the Commodore VIC-20 and 64, into the 80s. In 1982, the Commodore 64 delivered its first floppy disk drive, saving at-home coders from waiting nervously for programs to slowly load from a tape.

A revolution in sound

In a way, the Compact Cassette is just another chapter in the broader story of technology. It began as something of an oddity but, kicked along by engineers and companies over two decades, became a global phenomenon. That it thrived as a consumer technology for 30 years is a testament to how forward-thinking the Compact Cassette was when it arrived in 1963. Three cheers, Lou Ottens!

But when you consider the size of cassette decks compared with the cassette itself, it's the Sony Walkman that took the cassette to its ultimate conclusion. The Walkman didn't make the cassette portable — it made *using* the cassette portable. It might not have rivalled a Nakamichi Dragon for audio quality, but when it came to sitting on a crowded bus for two hours, nothing beat pulling out your Walkman and entering your own little world.

Another revolution beckons

Technology is never invented or created in isolation — in any technology genre, you almost always find a popular technology on the slide, one that is in its heyday and another coming to take its place. Even in the 70s heyday of the Compact Cassette, its successor was well on the way. Next time, we go back to the middle of that decade and re-trace the story of two technology antagonists joining forces to launch a new revolution that is still with us today.

The 1970s range of TEAC reel-to-reel recorders is still legendary today (Image credit: Rybkovich, CC BY-SA 4.0).

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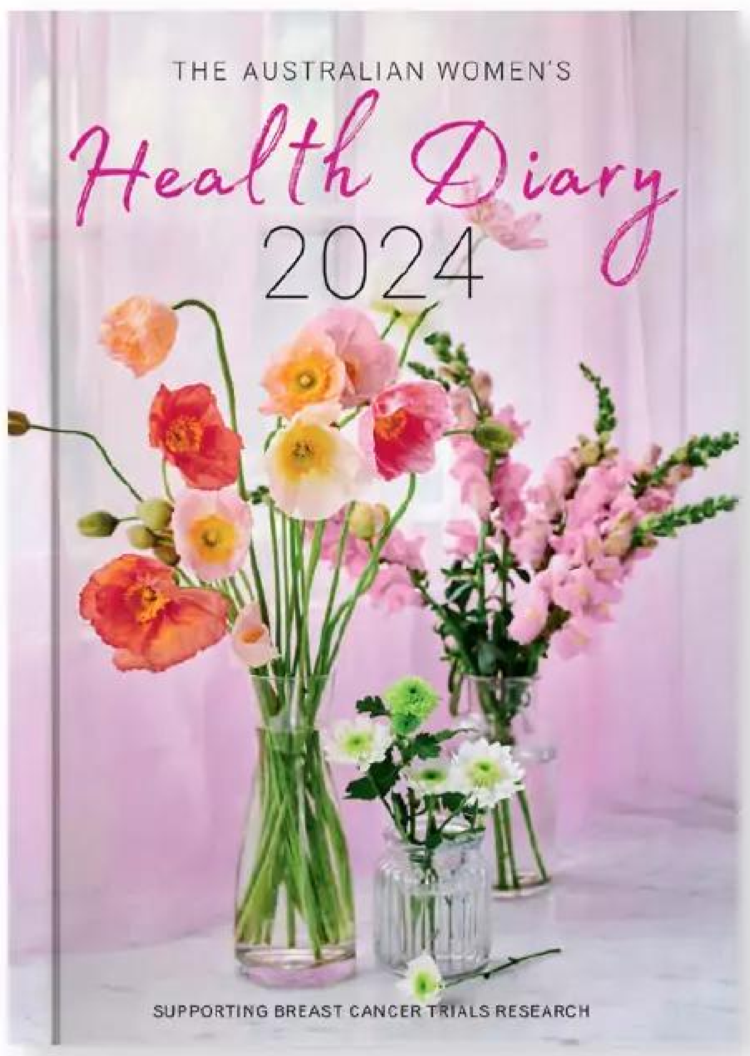

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HI-FI PRIMER

MY ODE TO THE COMPACT DISC

and how to make the most of your player

by **Ketan Bharadia**

Compact Disc's star has well and truly faded. At its peak, at the turn of the century, just short of a billion silver discs were sold in the USA in a year. Fast forward to 2022 and that number had dropped to just 33 million, with the format suffering the ignominy of being overtaken by vinyl (41 million sales). Given that the CD was originally developed to replace records, that is some fall from grace.

Of course, the success of streaming has played a large part in the downfall of the CD. How could it not? The major music streaming services — Spotify, Tidal, Amazon, Apple Music and Deezer — carry many millions of songs and most can deliver higher resolution than 16-bit/44.1kHz (CD-specification) quality. So, given the convenience, choice and source quality we enjoy from streaming services, why am I writing this piece in praise of a format that teeters at the edge of mass-market extinction?

Nostalgia has something to do with it, of course. I clearly remember when the CD was launched and all the excitement that went with it. Those early machines from the likes of Sony (CDP-101) and Philips (CD100, below) represented cutting-edge technology for the time, and though there was plenty of room for sonic improvement, the format was a clear step ahead of vinyl for the mass market.

Over the years I've been lucky enough to hear some great players, from Ken Ishawata-flavoured Marantz products to ultra high-end beasts from the likes of Wadia and dCS, and they have all thrilled. But that nostalgia isn't the driving force behind me writing this piece. My rekindled appreciation is down to the stream of tasty CD players I have reviewed in recent months.

Testing TEAC's excellent and beautifully engineered VRDS-701 CD player was a true

Right: For a first-gen effort, the Philips CD100 wasn't the most striking in terms of appearance, but the sound was naturally smooth and the error correction first-rate.

Arcam's CD5 player from its new Radia range of electronics offers three fairly commonplace filter options for users to experiment with – fast, slow and phase

pleasure. The company had clearly taken a lot of care to make a player that made sense in today's market, for those who still cling to their shiny discs for one reason or another. It is intuitive to use and offers a sensible range of features, including digital inputs that extend its usefulness. Most of all, it sounded right at home in the reference system, which is no mean feat considering that, at $4,199, it costs about the same as the cables used in that set-up.

Judging the CD player category for this year's What Hi-Fi? Awards shone a light on Arcam's excellent CD5 too, but also reminded me just how much I liked old favourites such as the Cyrus CDi and Marantz CD6007.

Like I expect most of you, I tend to use streaming — in my case from Tidal or from a fully loaded Naim NAS device — for most of my listening. Using the aforementioned CD players reminded me of the pleasure of reading printed production notes and just how nice it is not to rely on my phone or a tablet to operate my source.

I've lost count of the number of times I've been frustrated simply because the battery charge on my device is low and I've had to wait a bit to use my music streamer conveniently again. Equally, having to wait a few seconds for the streamer's app to make a connection has also become a bit of an annoyance. So, the lag-free response of a CD player to its remote is a real plus point. I like to use physical buttons rather than a touch screen to operate my hi-fi, too. It just feels nicer.

The mechanical whirring of the loading tray as it glides in and the high-pitched whine of the transport mechanism reading the disc give CD players a character that totally silent streamers just cannot match.

And while the ritual of actually loading the disc into the player and waiting for it to load serves to add to the sense of anticipation, for me the real appeal of the very best CD players is how good they can still sound. Put the TEAC against any equivalently priced streamer and I'm confident it would be better than most, even if the streamer were fed hi-res source material. There is a sense of stability and dynamic expression that the best-of-breed disc players have regardless of price point that makes most comparable streamers sound uncommunicative and mechanical.

But I don't think that's even the *most* important advantage of a CD player. Once you buy a CD, that music is yours. Provided you keep the disc in good condition, it will last a lifetime and you can play it whenever you want. Given the relatively temporary licensing arrangements streaming companies have on quite significant proportions of their catalogue, it is pretty common for albums — and consequently tracks on my playlists — to disappear from the service for a while. While I understand the commercial reasons this happens, it doesn't make things better when that song I absolutely have to hear isn't available. It would always be accessible if I had the CD.

There is also the attraction of rummaging. Sometimes I look at my library of CDs a little unsure of what to play. As I dig through the collection it is not uncommon for me to pick something random that I never would have thought of if I didn't see it first. That doesn't tend to happen when I use a streaming service and the result is that, over time, the range of music I listen to has narrowed.

I would like to be clear that I am not pining for CD to return to being the mass market format of choice. It will never be that again, and that is as it should be. Time, technology and formats have to move on, and streaming, while not perfect, is clearly a better proposition than compact disc for most people in most ways. But, given a good enough CD player and a matching disc collection, the original digital format still has a place for me.

Right, how to spin like you've never spun before...

Again, despite vinyl's strong and continued resurgence, there are many of us who, like me, still swear by our CDs and CD players, and therefore there are manufacturers who still produce dedicated disc spinners at both budget and high-end prices.

Many new all-in-one systems and network receivers/streaming amplifiers are starting to feature CD players alongside streaming smarts, too, such as Technics' SL-G7000M2 and SA-C600 and Audiolab's Omnia, to name just three. So if you're eyeing up a new CD-spinning player of any sort, or just want to breathe new life into the one you already own, I have put together some handy tips on how to get the most from your player and silver discs. And, in turn, your music collection.

Before I kick off, remember that it's important to look after your discs. While not as sensitive to surface scratches as vinyl, a compact disc will of course give you better sound if it's in good condition. If your disc is a little marked, at best you will experience a slightly worse sound, at worst it will cause your player to skip or refuse to play the music at all. So handle them with care, and always put the disc back in its case rather than leaving it loose to act as a coaster at your next party!

Before you buy

If you're upgrading or changing your player, it pays to buy the best you can realistically afford. After all, if the maximum information isn't being retrieved from the disc, it's impossible to replace the lost data further down the playback chain. Spending extra money will usually buy you a better build and improved sound quality.

If you're buying a new player, consider going for one with digital inputs. These will open up use with other digital sources — a computer, set-top box or DAB radio, for example — and will give you improved performance across all feeds thanks to the (hopefully) higher-quality digital-to-analogue circuitry. Because let's face it, a dedicated audio source is likely to have lavished more care on its DAC circuitry than any of the everyday product types mentioned above.

Give your CD player some solid support

First things first: make sure you install your player on a proper support to minimise the amount of vibration it has to cope with. Ideally, this would be in the form of an equipment rack. The perfect platform will be rigid, level and low-resonance.

While CD players don't show up the effects of vibrations as obviously as, say, turntables, simple things like footfall or even the sound from your speakers, especially at loud volumes, can make

> My rekindled appreciation is down to the stream of tasty CD players I have reviewed in recent months

The talented Technics SL-G700M2 is a versatile, modern-day digital source that, in addition to being streaming savvy, includes a CD disc drive.

the player's data-reading mechanisms work harder, which can affect the sound.

Not convinced? A cheap experiment is to put a partially inflated bicycle inner tube under the player and listen for any difference. Don't inflate the tube until it's hard; the trick here is to keep it as soft as possible while still lifting the player's feet off the support surface.

It may be a bit awkward to get the player level, but if you hear improvements then you know this is a course worth taking. If you don't, then hopefully you at least had a bit of fun in the process. As long as no one was watching.

It's all about connections

Just about every CD player will come with a pair of analogue cables in the box. It's best to consider these hook-ups as no more than a 'get started' measure. Even a budget player will sound better with some good interconnects, so arrange a demo and budget from around $60 for a better pair. Or more, naturally, if your system is of the high-end variety.

Most machines have standard phono sockets for their analogue output, but some also have the option of balanced XLRs. These can give better sound quality, but not always. It all depends on how well the balanced circuitry has been designed in both the source and amplifier.

Unfortunately, the only way to tell is to try it. In most cases — outside of higher-end products — I've found the single-ended approach to perform better, with the balanced option generally just sounding louder.

The other very handy facility you should consider using is an optical or coaxial digital output. This allows the player to be connected to an outboard DAC. It's something to consider if you have a player that's working well but you want to improve the sound. There are plenty of good DACs around, with Cambridge Audio's DacMagic 200M and Chord Electronics' Mojo 2 both excellent options at modest prices that could give a sonic uplift.

How easy is it to operate?

At its simplest, a CD player needs just one button to open and close the drawer, a couple to start and stop playback, and track-skip up/down controls. A headphone socket with its own volume control might come in handy for late-night listening, too.

CD players will come with a remote control as standard. The handset will let you access a range of functions — often including many that aren't available via the fascia buttons — and allow you to pause the music, skip tracks, programme a selection of tracks and so on. If you use an amplifier from the same brand, chances are the remote will 'drive' both it and the player.

Switch off the display

As well as letting you see which track is playing, some players show artist and title info when playing CDs with CD-Text. Strange as it may seem, it's not unusual for a player to sound better with its display turned off, as the display can create some electrical noise.

Perhaps even less obvious is the effect of switching off the digital outputs. This isn't a particularly common feature — the Marantz CD6007 has it — but it can give a small but notable improvement in clarity and dynamics. Bear in mind that you'll only notice this if the rest of your system is transparent enough.

Filters and upsampling

I'm seeing far more machines giving the option of changing digital filter parameters these days. Audiolab is a big fan of this approach on both its CD players and DACs (such as the M-DAC+ and 8300CD), as is Cyrus. And the new Arcam CD5 also includes a choice of filters to choose from. The default setting is usually the best measuring filter, but you may well find one of the other options sounds better with your system at home. It's well worth taking the time to experiment and find which flavour you prefer.

I'm less positive about the upsampling option on some players. If the implementation isn't spot-on, you end up with a smoother and more refined sonic presentation, but one where the attack and sparkle in the music have been diluted. And where's the fun in that?

Building your system

Just about any CD player will work with almost any amplifier — at least in electrical terms. Most players' analogue outputs deliver around 2V, give or take a few microvolts, and that's just what the amplifier's line inputs expect to receive. If you're using a vintage amp built before the CD age you may have some issues, but a simple modification will sort them out.

One final note: a system can only sound as good as its weakest link allows. If the rest of the components are unbalanced or poorly set up, any changes you make at the source end simply won't be revealed.

Once you've got everything set up perfectly, all you need to do is kick back, pop in your favourite album, and enjoy everything the Compact Disc still has to offer.

No 97. January/February 2024

esoterica

REVIEWED

Famous Naiad gets production-ready release

ULTIMATE REGA

REVIEWED

Pinnacle PSB performance

Reference Synchrony T800 blow us away

Inside Hulgich Audio

Meticulous builders of loudspeakers in Adelaide

Rega Naia & Aphelion 2

Turntable & moving-coil cartridge

+
- Exceptional clarity and detail resolution
- Transparency and naturalness
- Brave styling

–
- Sonically appeals to the head more than the feet
- Plinth's foam edges look a little unfinished

RRP **$24,999**

The Naia is the best turntable Rega knows how to make. Its roots go back to 2009 when the company embarked on a research and development project that aimed to push its core engineering beliefs of low mass and high rigidity to the limits. No compromise was allowed, as this was a cost-no-object exercise that was never intended to go on sale. That meant it could be designed purely for maximum performance using the most exotic materials and with no regard of how it could actually be put into production. The result was the legendary Naiad turntable. But there was a problem; people wanted to buy it.

At first, Rega resisted the idea, but such was the interest that it was forced to put the Naiad into a limited production run of 50 units. These were handmade and so awkward to build that only three people in the factory were considered skilled enough to do it, including the CEO, Phil Freeman, a watchmaker by trade. The Naiad's price? £30,000 in the UK.

Rega considers the new Naia the production-ready version of the Naiad. The original plan was to design a deck that bridged the performance gap between the Naiad and existing Planar 10 turntable, but that changed when the company found the new design could be developed to match the range-topper's performance.

BUILD & DESIGN

The Planar 8 and Planar 10 have flown the flag for Rega's distinctive skeletal plinths, but this design still looks outlandish. It is surprisingly small and light, and in the case of the Naia features a Tancast 8 foam core sandwiched on either side by Graphene-impregnated carbon fibre. The foam reduces the transmission of vibrations while the carbon fibre skins help rigidity. The area between the arm base and main bearing is further strengthened by the use of ceramic braces, forming a stressed beam assembly that avoids energy absorption without increasing mass too much. It plays to Rega's firm belief that 'mass absorbs energy and lost energy equals lost music'.

The Naia's main bearing assembly is special. Both the central bearing and the spindle are made from a composite ceramic material called ZTA (Zirconium Toughened Alumina), which is known for its hardness and resistance to abrasive wear, making it ideal for this job. Rega claims this to be the most accurate and long-lasting main bearing assembly it has ever produced. The spindle sits in the middle of a beautifully machined aluminium sub-platter, which is something of a work of art. Really, it's a shame this part is hidden once the ceramic main platter is in place!

Rega has used ceramic platters for years now, valuing their rigidity. This is also one of the few components where the brand's engineers prefer to add mass. The Naia's platter is shaped on the underside so that most of its mass is concentrated around the perimeter to help the flywheel effect and improve speed stability. A trio of round-sectioned belts connect the deck's 24V motor and sub-platter. Rega spent three years researching and developing rubber compounds for its belts and has achieved a level of consistency and accuracy that it is proud of. Why three belts? The 2.6kg weight of the Naia's ceramic platter requires these for a quick

It is possible to buy the Naia without the factory-fitted Aphelion 2... but the two go so well together...

This Rega sounds clean and crisp, delivering class-leading levels of detail without ever edging into sterility

start-up. Any microscopic differences between the three belts are levelled out, too, helping with speed stability.

The Naia's motor is a 24V low-noise design controlled by an outboard power supply. This power unit is housed in a functional-looking half-width box and offers electronic switching between 33⅓ and 45RPM. The supply's internal circuitry uses DSP and a high-stability crystal to ensure that the motor gets a clean and precise power feed, with each unit specifically adjusted for its partnering motor during the manufacturing process to minimise vibrations.

Rega makes big claims for the Naia's RB Titanium tonearm. Its shape may be entirely familiar but, as the name makes clear, it now makes extensive use of titanium rather than aluminium. The change of material and redesigned bearing assembly have resulted in a lighter and stiffer design. The shiny finish is gorgeous, but it is the precision and low friction movement of the bearings that most impresses.

It is possible to buy the Naia without the factory-fitted Aphelion 2 moving-coil cartridge for $19,999, but the two go so well together that it is all too tempting to buy the complete package. Unsurprisingly, the Aphelion 2 sits on top of the Rega cartridge tree. It has a graded black anodised aluminium body and a boron cantilever with a fine-line 'nude' stylus. The company's three-point mounting arrangement, which has proven itself time and time again for many years, ensures that its own cartridges are perfectly aligned in the headshell. It's such a fuss-free arrangement that it's a shame more companies don't follow suit. Rega thoughtfully supplies a torque wrench to ensure the cartridge isn't over-tightened into the headshell, too, so avoiding any damage.

The Aphelion 2 tracks well at the recommended 1.9g downforce and has no issues working into a reference Cyrus Phono Signature phono stage, though there's little reason to think that Rega's own high-end Aura MC phono stage wouldn't deliver even better results.

PERFORMANCE

As the testing process begins, just for fun we place the Aphelion 2's stylus on the record but don't start the motor. We turn up the volume level on our amplifier and (very) lightly tap the support and part of the plinth just to hear what kind of resonances the deck generates. It turns out that the Naia's rigid yet light construction means it is excellent at dealing with low-level external vibrations. We hear a quick thud that quickly dissipates. Trying the same thing with the Technics SL-1000R (a high mass, heavily damped, direct drive design) is eye-opening, with that initial thud not only louder but also lingering for longer. It is accompanied by a surprising amount of higher-pitched ringing from the deck's structure, too. It's hardly the most scientific of experiments admittedly, but it strongly suggests that Rega's light and rigid approach has plenty of merit. Even so, as with any record player, if you want to get the most from this deck, place it on a rigid, low resonance support that's positioned well away from your speakers.

A source at this level demands top-class partnering equipment. Along with the aforementioned Cyrus phono stage, connected for the testing process is a moving coil-equipped Burmester 088/911 MkII pre/power combination driving either ATC's SCM 50 or Wilson Benesch's A.C.T. 3zero floorstanders. The system's cables are a mixture of premium offerings from Chord Cables and Vertere Acoustics.

As you move up the hierachy and price points of Rega's turntable lineup, from the entry-level Planar 1 through the mid-range Planar 3 and ending with the (former flagship) Planar 10, it is clear that each step up the range has a less obvious sonic character. They become more transparent and put less of an imprint on the recording. This process reaches its obvious conclusion with the Naia, which is essentially the purest representation of the company's

engineering philosophy to date.

Those expecting sonic fireworks from the Naia/Alphelion 2 are in for a disappointment. While the first few rungs on the Rega ladder excel at sounding more entertaining and exciting than most of the competition, this range-topper isn't that kind of product. It prefers to step quietly into the background leaving the recording to take the spotlight. This Rega sounds clean and crisp, delivering class-leading levels of detail without ever edging into sterility.

This is very much an expert music-making machine. It's utterly gripping regardless of whether it's playing something grand like Beethoven's Ninth Symphony or the more intimate music of The Carpenters. On orchestral works, it renders an expansive soundstage that displays an impressive degree of depth and focus. There is plenty of air around instruments and a wonderful lack of clutter in the presentation, no matter how complex the music gets. The Naia/Aphelion 2 combination sounds as composed and controlled as they come, yet retains the fluidity that many highly resolving alternatives lack.

There is plenty of scale to the sound, and for all its agility and articulation there is a good dose of authority when the music demands it. Sometimes when a component sounds fast and responsive it is because it lacks low-end weight and power. That isn't the case here, as a comparison with a Technics SL-1000R/Kiseki Purpleheart MC proves. Superficially, the Technics sounds more muscular, but it doesn't take long to figure out that the Rega is significantly better with low-frequency transients, delivering them with greater heft and power while also revealing that the Technics has a slightly sludgy quality in comparison. Elsewhere, the natural way that this Rega player renders instrumental textures and can convey low-level dynamic shifts with such conviction is wholly satisfying. It sounds authentic and honest.

The Carpenter's 'Best Of' collection proves that the Naia can shift down a gear effortlessly, delivering Karen Carpenter's pristine vocals with considerable skill. There's delicacy here and a real sense of force when it's needed. Tonally, things are as even as you like, with the Aphelion 2 sounding balanced and ever so detailed.

Complaints? The Naia is an exceptional performer in most ways, but its otherwise admirably off-hand approach to music-making did leave us wanting more in the way of rhythmic drive. Listening to Michael Jackson's *Smooth Criminal*, we're deeply impressed by the Rega's ability to organise the dense instrumentation into a wonderfully cohesive and musical experience, yet still find ourselves questioning whether it should make more of the song's hard-charging momentum. Don't get us wrong, this package is certainly surefooted and confident when delivering rhythm tracks, but compared to a rival like Vertere Acoustics' MG-1 MkII/Mystic it does sound a bit polite and subdued in comparison.

CONCLUSION

Even so, there is no denying that the Rega Naia is a magnificent achievement. It is as insightful and natural-sounding a record player as there is out there at its price point, and manages that through truly ambitious single-minded engineering. It is clearly one of the best high-end record players available at this level and a must-listen for anyone interested in knowing just how good vinyl can really sound.

TECH SPECS & CONTACT

Type: Belt drive
Operation: Manual
Speeds: 33⅓, 45 RPM
Speed change: Electronic
Cartridge: Aphelion 2 moving coil
Phono stage: No
Dimensions: 12.5 x 42 x 35cm (hwd, with dust cover)
Weight: 4.65kg
Finishes: Black only

Distributor: Synergy Audio Visual
Address: 107 Northern Road, Heidelberg Heights, VIC 3081
T: (03) 9459 7474
W: www.synergyaudio.com
E: info@synergyaudio.com

PSB Synchrony T800

Loudspeakers

\+
- Superb bass performance
- Accurate mids and highs
- Overall lovely sound quality

−
- Imposing size
- Veneer finish

RRP **$18,999**

PSB was founded by famous Canadian loudspeaker designer Paul Barton and his wife Sue (Paul and Sue Barton… PSB… get it?). Their company became so successful that the privately owned Canadian Lenbrook Group (which also owns the NAD and Bluesound brands) made the couple an offer for it that they couldn't refuse — particularly since they wanted Paul to stay on as the lead designer for all PSB products, so Paul got to sell his cake and eat it too!

Barton is renowned for being a 'sound quality first, looks second' designer; an engineer who won't sacrifice sound quality for fashion — and this philosophy is a little on show with the new Synchrony T800 design. They're not exactly small, nor are they exactly sculpted like some modern tower speaker designs. They also have rather blocky-looking outrigger feet at each tower's base that are, again, not exactly good-looking. In a world where most large and expensive loudspeakers are rather curvaceous, the T800 are decidedly boxy, not to mention only available in two finishes!

So even though the Synchrony T800 are touted as 'cost no object' designs, I suspect that, unlike some speaker manufacturers who shall remain mercifully nameless, Barton was unwilling to spend more money on cabinets than he did on the drivers and crossovers built into them.

THE EQUIPMENT

I have to admit that I was initially baffled by the description of the design of the Synchrony T800 as being a 'transitional' bass reflex one, so this was one of the first aspects of the design I investigated. It turns out that Barton has adapted a specific type of crossover design that is used in many two-way loudspeakers that use two bass/ midrange drivers in combination with a single tweeter, and repurposed it for use in this four-driver, three-way configuration. I can't recall ever having seen this design approach previously. But before scrutinising that 'transitional' crossover topology further, let's first look at what I believe to be the most important aspect of the Synchrony T800's design — because it is by far and away the most important: the fact that it is a true three-way design using three large-cone (203mm) drivers to deliver low-frequencies, a somewhat smaller-cone (133mm) driver to deliver midrange frequencies, and a 25mm titanium dome tweeter to deliver high frequencies.

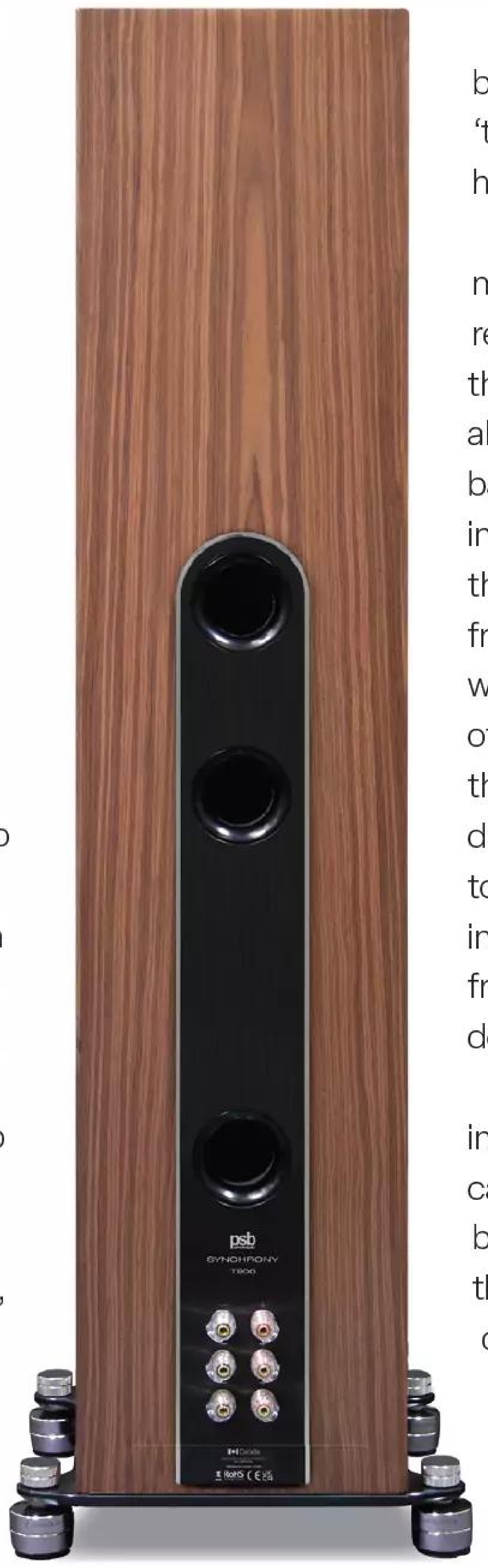
The importance of the three-way design is that it eliminates a serious acoustic problem called phase modulation distortion, or PMD, which affects *all* loudspeakers that do not have a dedicated midrange driver. This distortion occurs whenever a single speaker cone is called upon to reproduce low and midrange frequencies simultaneously, which is what happens in all two-way (and 2.5-way) speaker designs.

Phase modulation distortion is sometimes called 'Doppler Distortion' because many people learned about the Doppler effect in their high-school physics classes, which makes the PMD mechanism easier to explain. So, If a driver is required to produce a single low-frequency sound — at, let's say, 55Hz — its cone will move forwards and backwards fifty-five times per second and your ear would hear the resulting movement of air as the musical note A1. This pitch is an octave above the lowest 'A' on a piano keyboard, hence the '1' suffix.

But if that same driver is also asked to produce another musical note — say, middle-C, which has a frequency of 261.63Hz — it would have to move forwards and backwards 261.63 times per second at the same time that it is also moving forwards and backwards 55 times per second. This means the frequency of what *should* be middle-C will not always be precisely 261.63Hz but actually be shifted up to 55Hz higher or lower (depending on the direction the cone is moving) as a result of having to produce the 55Hz signal simultaneously. Obviously, this introduces considerable distortion into the music! (I don't want to go into *too* much detail about PMD in this review, so if you want to learn more, you can read a complete explanation, complete with measurements, here: https://sound-au.com/ doppler.htm.

Another important thing to note about the T800's midrange driver is that its construction is exactly the same as that of its three bass drivers, using the same cone material (carbon fibre) and roll surround material (rubber). This essentially means that the sonic 'signature' of the midrange driver will be exactly the same as that of the bass drivers. In designs where the construction of the midrange and the bass driver(s) differ, they will produce completely different sonic characters, which is obviously not desirable.

There's a further aspect of the Synchrony T800's cone driver construction that is important to note: the roll surrounds that allow the cones to move are all made from rubber. This is exceedingly important for anyone in Australia (or New Zealand) because rubber surrounds are far more durable than the foam ones often used for this purpose. (The high levels of ultraviolet radiation in Australia and New Zealand destroy the foam.)



So let me get back to what is behind the company's use of a 'transitional' bass reflex design and how it works…

In most designs that use multiple bass drivers, all the drivers receive the very same signal from the crossover network. Also, in almost all cases, those multiple bass drivers 'share' the same space inside the speaker cabinet, and the problem there is that output from the rear of each driver cone will affect the movement of the others, often adversely. Because the drivers must necessarily be in different positions on the baffle, too, each one causes resonances inside the cabinet at different frequencies, which is usually also detrimental to sound quality.

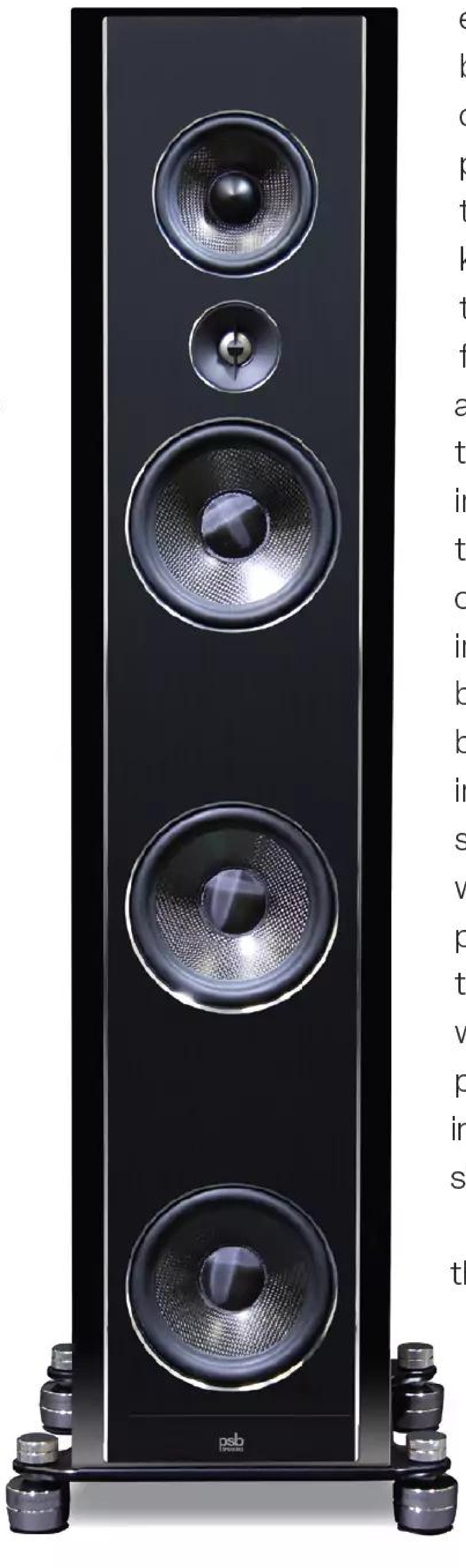
There's also an issue that occurs in every floorstanding loudspeaker called 'floor bounce' where, because the bass driver is close to the floor, a reflection from the floor creates a 'notch' or 'suck-out' in the sound coming directly from the driver itself. The frequency of this interference depends on the distance between the

bass driver and the floor, as well as the distance between the speaker cabinet and the listening position, but you wouldn't go far wrong to say that it mostly occurs at frequencies between 100Hz and 200Hz.

A final issue affecting designs with multiple bass drivers is that if they're delivering exactly the same range of frequencies, you will get the same 'interference' effects when the signals from the drivers interfere with each other in the air in front of the speakers. In this specific case, the interference can introduce 'dips' and 'bumps' in the response — dips when the signals cancel; bumps when they reinforce each other.

In the Synchrony T800 design, PSB has addressed all these issues! Firstly, each cabinet is partitioned internally so that each of the drivers is in its own unique acoustic space, meaning the output from the rear of one driver cone cannot interfere with any of the other drivers, either directly or because of resonances. Secondly, the different heights of the drivers mean that the effect of floor bounce is spread over a wider range and so has less effect on the sound. And thirdly, interference between the bass drivers is minimised because they do not all operate over the same low-frequency range courtesy of that 'transitional' bass reflex design.

In this transitional design, each bass driver is high-pass filtered at a different frequency, so although all three operate at the lowest frequencies, the bottom driver is rolled off earlier than the one above it, and that one is rolled off earlier than the top one, so that, ultimately, each driver progressively operates over a smaller bandwidth. We are not, therefore, surprised that PSB says of the T800's crossover network: "This is the most advanced amplitude-perfect Linkwitz-Riley 4th order crossover that PSB Speakers has ever utilised, featuring high-voltage poly film capacitors and oxygen-free interconnect wire for complete driver control."



Rather unusually, you can access each of the filter sections directly using the six speaker terminals provided on the rear of each tower, which means you can bi-amp or tri-amp the speakers if you want. PSB says the audible effects of doing this "may be subtle, but the benefits include; transients are less likely to cause clipping and/or speaker damage, reduced distortion and the elimination of errors at low frequencies, while also providing better matching between the power amplifier and speaker."

The six terminals come pre-fitted with a curious buss bar system. If you use the buss bars to link the terminals, you can't use bare wires or small spades at the same time; you have to instead remove the plastic inserts from the clear plastic 'WBT-look' speaker terminals and then use banana plugs to make the speaker wire connections. (The terminals will, however, accept bare wire or small spades if the buss bar is removed.)

The separate internal acoustic space for each driver is ported, so each sits in its own bass-reflex environment, though you can block the output from any one (or all) of the ports with port plugs. PSB says of these ports' usefulness: "Two port covers are supplied with each tower. The port cover can be used to adjust the bass tuning of the Synchrony where room problems at low frequencies (in the 100Hz region) occur. It is well known that the room can dominate the performance of the low frequencies below 200Hz and the added flexibility of a port cover can tweak/improve the performance in problem room setups. We invite the listener to try plugging any one or multiple ports to better integrate the system in their room because any adjustment of the bass balance could be a welcome improvement in a given system setup. Please experiment; it will be worth the effort. It is impossible to predict what type of room or what the system setup will be; therefore we think the flexibility of multiple ports allows the speaker to be integrated better in a wider variety of situations." So, experiment!

As for the port covers themselves, whereas most manufacturers supply cheap soft foam covers that cost only a few cents each, will deteriorate in the same manner as foam surrounds, and 'leak' sound (because they're porous), the port covers provided by PSB are made from massively thick rubber with flexible ribbing and fit tightly into the ports — nothing is going to get past these bungs! That leaves only the mystery of why just two port covers are supplied for each tower when each has three bass reflex ports! The review sample loaned to me were showroom demo speakers, so perhaps whoever packed them up simply forgot to include all of the covers.

As you can see from the image on this page, the Synchrony T800 are supported by an outrigger base-plate design fitted with IsoAcoustic GAIA II feet. These feet are based on the same three-part technology as IsoAcoustic's award-winning GAIA II isolators. The outrigger design is intended to increase the T800's stability, but even with the feet the speakers are still a bit 'tippy', so be sure to position them somewhere they can't accidentally be bumped. The 10mm-thick steel plate on one of our speakers was a bit loose, too, so it might be worth using a hex key to ensure the screws haven't loosened during shipping. (Note that the base plate comes pre-installed; you just have to install the GAIA II feet yourself.)

As for the GAIA isolators themselves, PSB says that: "The isolators provide a high degree of speaker isolation and control while resisting lateral movement and oscillations to maintain accuracy and alignment with the listening position. Internal reflections with the supporting surface are attenuated, resulting in greater sound clarity and openness." My only gripe with the GAIA's design is that it resists lateral movement so effectively that you can't really manoeuvre the speakers once they've been placed in position without potentially damaging the isolators. This isn't really an issue, it just means that you should establish precisely where the speakers should be positioned in your room, including how they should be angled relative to the listening position, before you install the isolators.

I was a little confused by the mounting arrangement for the GAIA feet, too, because the threads machined into the base plate are too big for the GAIA threads. This means that a second double-threaded 'insert' has to be screwed into the plate threads, after which the GAIA feet screw into the smaller diameter insert. I can only imagine that PSB had originally intended to use different feet — perhaps even ones it had designed itself.

Note that although the T800's cabinet is available in either Satin Walnut Veneer (over MDF) or High Gloss Black, to use their finish's official names, the front baffle is covered by a black aluminium sheet which ensures, according to PSB, "maximum rigidity and density." Magnetic grilles are provided as standard, too, completing what is ultimately a rather smart package in either finish.

IN USE AND LISTENING SESSIONS

It would be remiss of me not to point out that PSB has been getting a 'leg up' from the Canadian government for many years, as much of the design and development work for its speakers over the 50 years it has been building them has been undertaken not at PSB but at the National Research Council's state-of-the-art acoustic laboratories in Ottawa. The NRC is a nationwide organisation of government-funded institutions in Canada, and its acoustic facility was made famous in audio circles by the now-renowned acoustician Dr Floyd E. Toole, whose research data is today used by every loudspeaker company in the world. However, although the development and design all took place in Canada, the T800 are manufactured in China — a fact that, to its credit, PSB makes abundantly clear both on the packaging and multiple times on the cabinets themselves.

Barton was only 23 years old when he started working with Toole, and the two remain firm friends (though Toole no longer works for NRC, or indeed for Harman International where he moved after leaving NRC). "Floyd was and still is my mentor," says Barton. "Very quickly after we met, we became very good friends — in fact, when I was in Ottawa I would often stay at Floyd and Noreen's home. So we worked and played together, you could say. Not to mention listened to a lot of music." You can read more about those times here: tinyurl.com/PSBHistory.

Barton says the biggest factors in determining whether listeners will find the sound of a loudspeaker realistic or not are the linearity and extension of the speaker's on-axis frequency response and how closely the off-axis frequency response resembles the on-axis one. We didn't need to look at any graphs at all in order to realise that Barton had aced all of those factors in the Synchrony T800's design because they sounded fantastically real in our listening room right from the get-go, delivering a powerful, deep and authentic bass response, a totally natural-sounding midrange, and high frequencies that reached out to the stratosphere.

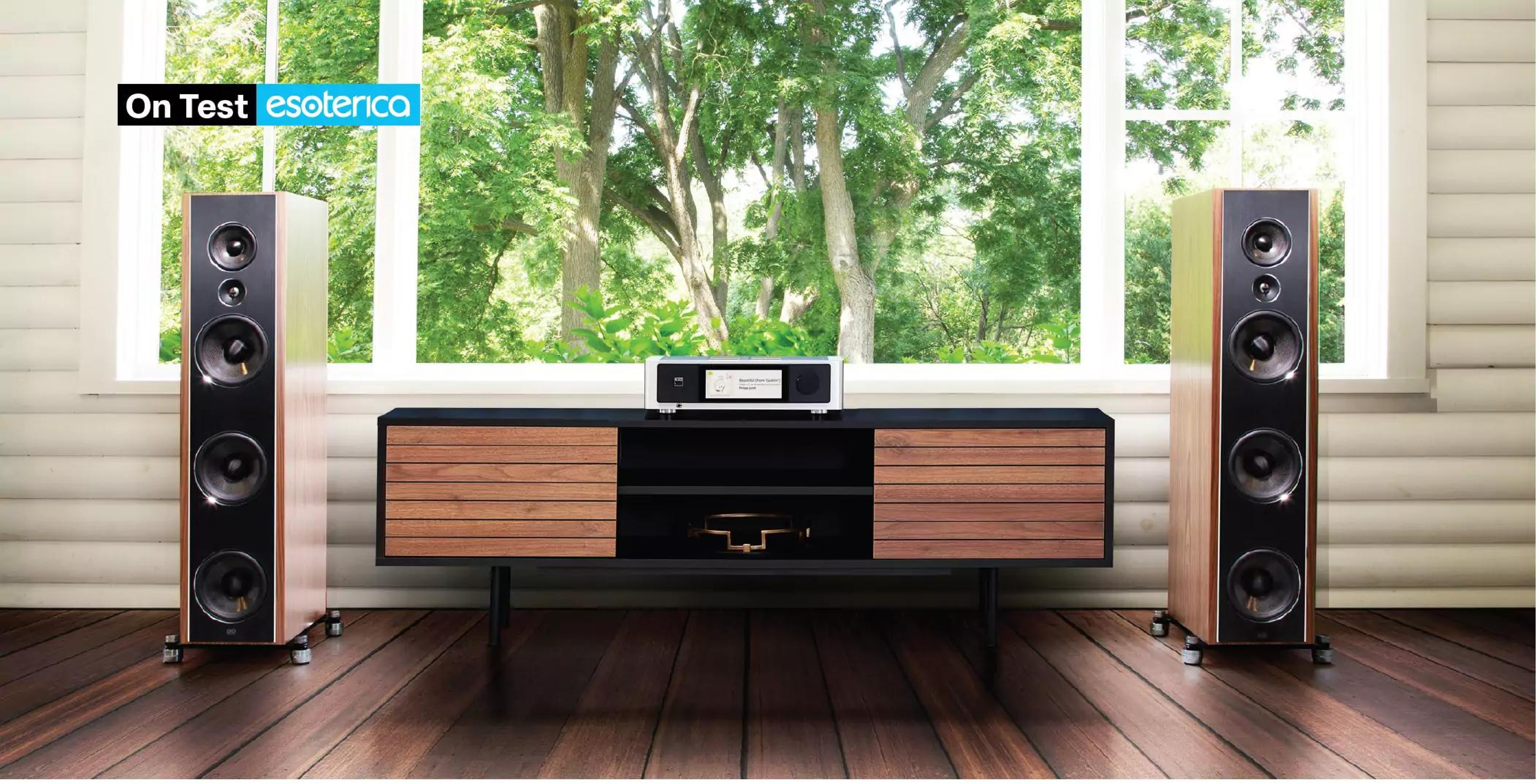
Set-up was simple, although these speakers are so large that they are going to be very visible even in a large room. I found they worked fantastically well when placed very close to a rear wall, a position which will make them less visually intrusive. And I also preferred their bass reproduction — in terms of both timbre and volume level — with the port plugs used in the bottom-most ports. I also liked the sound best when both speakers aimed directly 'up' the listening room. I didn't angle them in at all, but if you're sitting closer to them than I was (that is, about four metres), a little off-set could well be appropriate.

As stated earlier, the bass was powerful, extended and authoritative. You most definitely will not need an external subwoofer if you're using these in a stereo system, though if you're lucky enough to have them at the helm of a multi-channel home cinema system, using a sub would make sense, in which case we'd recommend PSB's own SubSeries 450 DSP sub as being the best acoustic 'fit' for this design.

It's pretty hard to go past listening to an orchestra in full flight if you're testing bass, because the instruments are acoustic and so you know what they sound like, and orchestral percussion, in particular, delivers some of the lowest frequencies the human ear can detect. And if you can add a pipe organ into the mix, so much the better! You will not, then, be surprised that one of the first works I played was Saint-Saëns' famous Symphony No. 3, often known simply as the 'Organ Symphony' and which he dedicated to the memory of Franz Liszt.

Whereas many organ aficionados would reach for the version with Charles Munch and the Boston Symphony Orchestra, which has Berj Zamkochian on organ (my musical choice would be Eugene Ormandy and the Philadelphia Orchestra with Michael Murray), the version I listened to featured Jean-Jacques Kantorow and the Orchestre Philharmonique Royal de Liège with Thierry Escaich on organ; I think it has the best sound quality of the three, a quality that has been beautifully captured on SACD by BIS

I just had to fire up Joni Mitchell's 'Blue'… the PSBs delivered it as well as I've ever heard it, from Mitchell's voice to her guitar, her piano and her faithful Appalachian dulcimer



(BIS2470) and so is, in my mind, more suitable for critical loudspeaker evaluation.

Just before the organ is introduced, the atmosphere is breath-quiet, so the plucked strings (cello and bass) and tones of the clarinet and oboe created a tension I can't recall experiencing previously— one that is released first by the organ's softly sustained A-flat, then heightened once again by the switch to D-flat major, introducing a ghostly mysterious and haunting dialogue between the organ and the strings that permeate the second movement. Simply stunning, not least because the T800 reveal the lowest organ pedals, which simply aren't audible through most loudspeakers. Even if you aren't a classical music fan, I recommend you take ten minutes to audition the closing minutes of this symphony through the Synchrony T800 at the highest volume your dealer will allow. Just make sure you leave your credit card at home before you do!

The human voice is, of course, an essential part of auditioning any loudspeakers because that's the sound our ears and brains are tuned to be the best at assessing. I started a little low in the frequency range, with the bass/baritone/tenor *a capella* sound of The Fairfield Four and their great album 'I Couldn't Hear Nobody Pray'. Right from the first track, *Noah*, I could hear that the Synchrony T800 were accurately delivering the sound of the four voices, and then when *These Bones* chimed in, well, just wow!

Using female voice to test a little higher in the frequency range, I just had to fire up Joni Mitchell's 'Blue', which she recorded back when she was a mezzo-soprano with a wonderful vibrato, yet was able to drop down to the contralto that she'd stick with in later years as her age diminished her ability to reach the higher notes. It's an album I never tire of playing. The PSBs delivered it as well as I've ever heard it, from Mitchell's voice to her guitar, her piano and her faithful Appalachian dulcimer. And can't you just tell that it's James Taylor on guitar? The Synchrony T800 make that abundantly clear!

Loudspeakers that can accurately reproduce Saint-Saëns' Symphony No. 3 at high volume levels will be able to accurately reproduce any type of music at all at any volume, but I found listening to the PSB Synchrony T800 so pleasurable and exciting that I continued my auditions for much longer than was necessary to draw my conclusions. I can, therefore, tell you that if you want to fire up some rock to test the T800 yourself, make sure you listen to Pink Floyd's 'The Wall'. In *Another Brick In The Wall: Part 1*, listen to the incredible detailing — the way it is so easy to hear the children playing in the schoolyard and the atmospherics around the highest frequencies. Then, in *The Happiest Days Of Our Lives*, the interlude before *Another Brick In The Wall: Part 2*, the sound of the bass and the drums is just awesome — particularly that of the cymbals, both the crash and the cut-off. When *Part 2* kicks off good and proper, that deep bass is again gut-wrenching, but don't miss how it is so perfectly pitched by the T800. When the organ and lead guitar perform their 'dual solo', listen to how the organ is phased and that the guitar is not — a trick made crystal-clear by the PSBs.

Of course, you can't play any one Floyd album without also playing 'Dark Side of the Moon' as well, so I did, and my admiration for the PSB Synchrony T800 grew even more for it. Listen to the cymbal ride in *Breathe (In The Air)*, the clock sounds in *Time* and the piano sound and wordless vocal in *Great Gig In The Sky*. You certainly won't want to miss the sonic madness of *Money*, either.

You can evaluate the PSB T800's extreme high-frequency performance with the synthetic sounds permeating all of Bjork's masterpiece 'Vespertine', but if you only want to trial one or two tracks (Bjork being an acquired taste), make them *Pagan Poetry* and *Hidden Place* (in that order). And if you'd prefer your high-frequencies to sound very real, I can't think of a better album for this than John Klemmer's 'Touch', which is full of them, with the added bonus that you get to hear Klemmer's silky-smooth tenor saxophone and the perfectly-paced percussion of John Guerin and Joe Porcaro. Dive straight into the title track for the ultimate high-frequency experience, but then be sure to move on to *Dolphins* and the tinkling treble in the left channel that are as high in frequency as anything you will ever need the PSB Synchrony T800 to reproduce.

CONCLUSION

I would rate these new PSB Synchrony T800 loudspeakers as being amongst the very best-sounding we have ever heard, irrespective of price. At the price being asked for them, there are no others I can think of that come even close to approaching their sound quality. They are that rarest of all finds — true high-end audio bargains!

Greg Borrowman

TECH SPECS & CONTACT

Brand: PSB
Model: Synchrony T800
RRP: $18,900 (per pair)
Warranty: Five Years
Design: Transitional three-way bass reflex
Frequency Response: 21Hz–23kHz ±3dB
LF Cutoff: 20Hz
Crossover: 450Hz (B3), 1.8kHz (LR4)
Sensitivity: 89dB SPL (Anechoic), 91dB SPL (Room)
Nominal Impedance: 4Ω
Minimum Impedance: 4Ω
Tweeter: 25mm titanium dome with ferrofluid
Midrange driver: 133mm carbon-fibre
Woofers: 3 x 203mm carbon-fibre
Dimensions: 121 x 38 x 40cm (hwd)
Weight: 45.4kg
Finishes: Satin Walnut Veneer, Gloss Black

Distributor: Amber Technology Pty Ltd
Address: Unit 1, 2 Daydream Street Warriewood, NSW 2102
T: 1800 251 367
E: info@ambertech.com.au
W: www.ambertech.com.au

Laboratory Test Report

Readers interested in a full technical appraisal of the performance of the PSB Synchrony T800 Loudspeakers should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

Graph 1 shows the in-room response measured by *Newport Test Labs*, with the speaker placed well clear of all boundaries. The trace is the averaged result of nine frequency response measurements made with the microphone positioned at nine different points in front of the speaker, with the central point on-axis with the tweeter. All responses were obtained using pink noise as the stimulus to replicate approximately what would be heard by the human ear.

You can see that the frequency response of the Synchrony T800, as measured by *Newport Test Labs*, extends from 30Hz to 20kHz ±3dB, which is extraordinarily close to PSB's own specification and an amazingly good result — particularly that low-frequency response, which is the most extended I can recall having ever seen for a floorstanding loudspeaker design. As for the high-frequency response, that actually extends a little higher than 20kHz, but that can be seen on a different graph (Graph 2, about which more in a moment).

What you should note from Graph 1 is that there is almost no 'floor bounce' effect visible on the trace at all; the response is within around ±1.5dB from roughly 60Hz to 15kHz —extraordinarily flat and linear; and there's no 'skew' to the overall response, meaning the T800 are tonally balanced across bass, mids and highs.

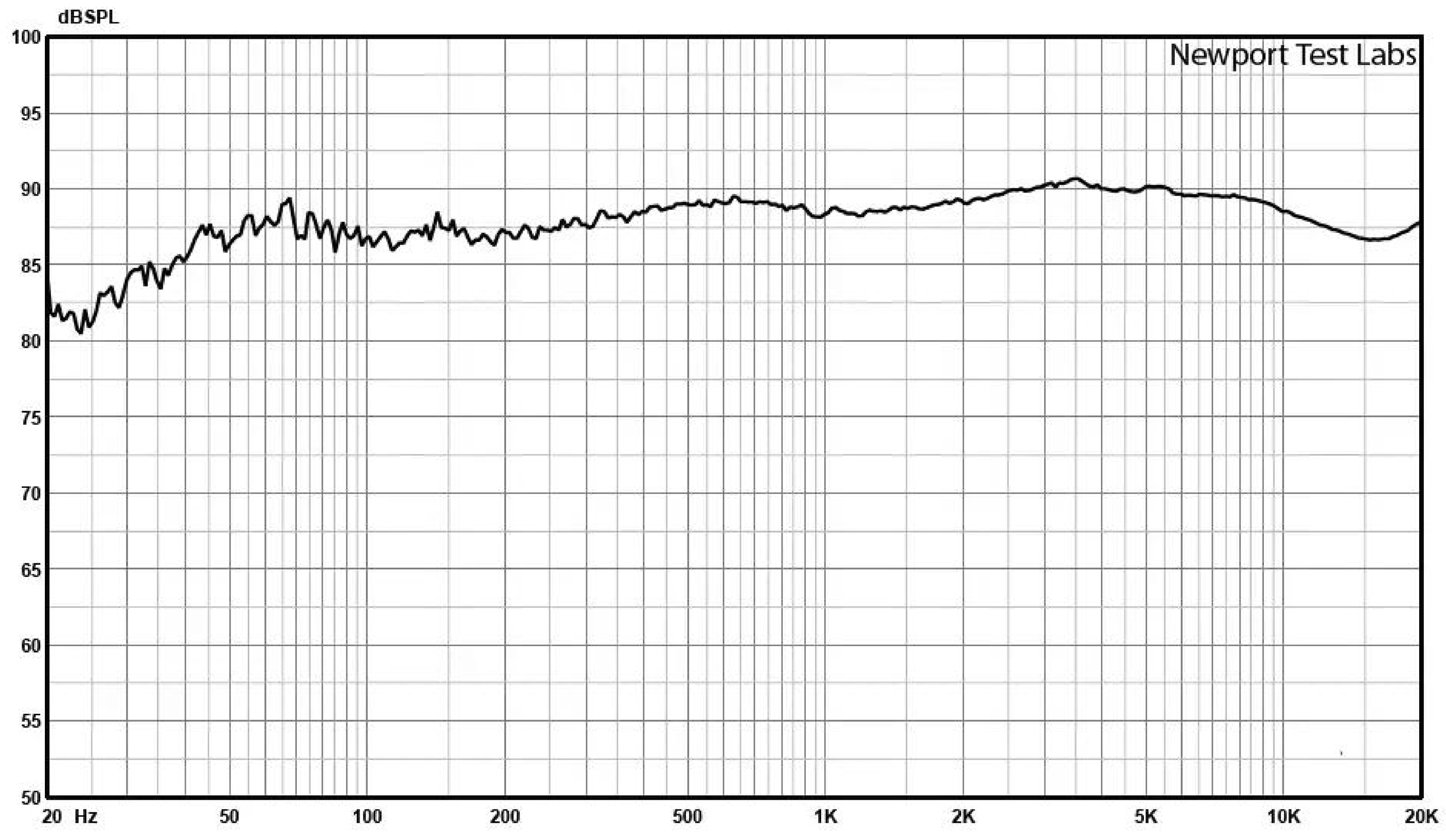
As hinted at earlier, Graph 2 shows the T800's midrange and high-frequency response in much greater detail than Graph 1, owing to the use of a much more critical measurement technique that is microscopic in its accuracy. It also shows the difference in the response depending on whether you use the loudspeaker grilles (red trace) or not (black trace). Finally, it shows the T800's response between 20kHz and 40kHz, which Graph 1 does not.

The most obvious finding from Graph 2 is that the speakers' response rolls off quite sharply above 15kHz to a null at 16kHz, after which it rises to shelve at 17kHz, and out to 22kHz at a level that's around 5dB below the average midrange level. There's then a significant peak in the response at 23kHz — the resonant frequency of the T800's tweeter. The reason this dip and shelf isn't shown on Graph 1 is that, as previously noted, it was measured using pink noise and the measurement was third-octave averaged to replicate what the human ear would hear. The human ear would not be able to perceive either the dip at 16kHz or, indeed, the shelf.

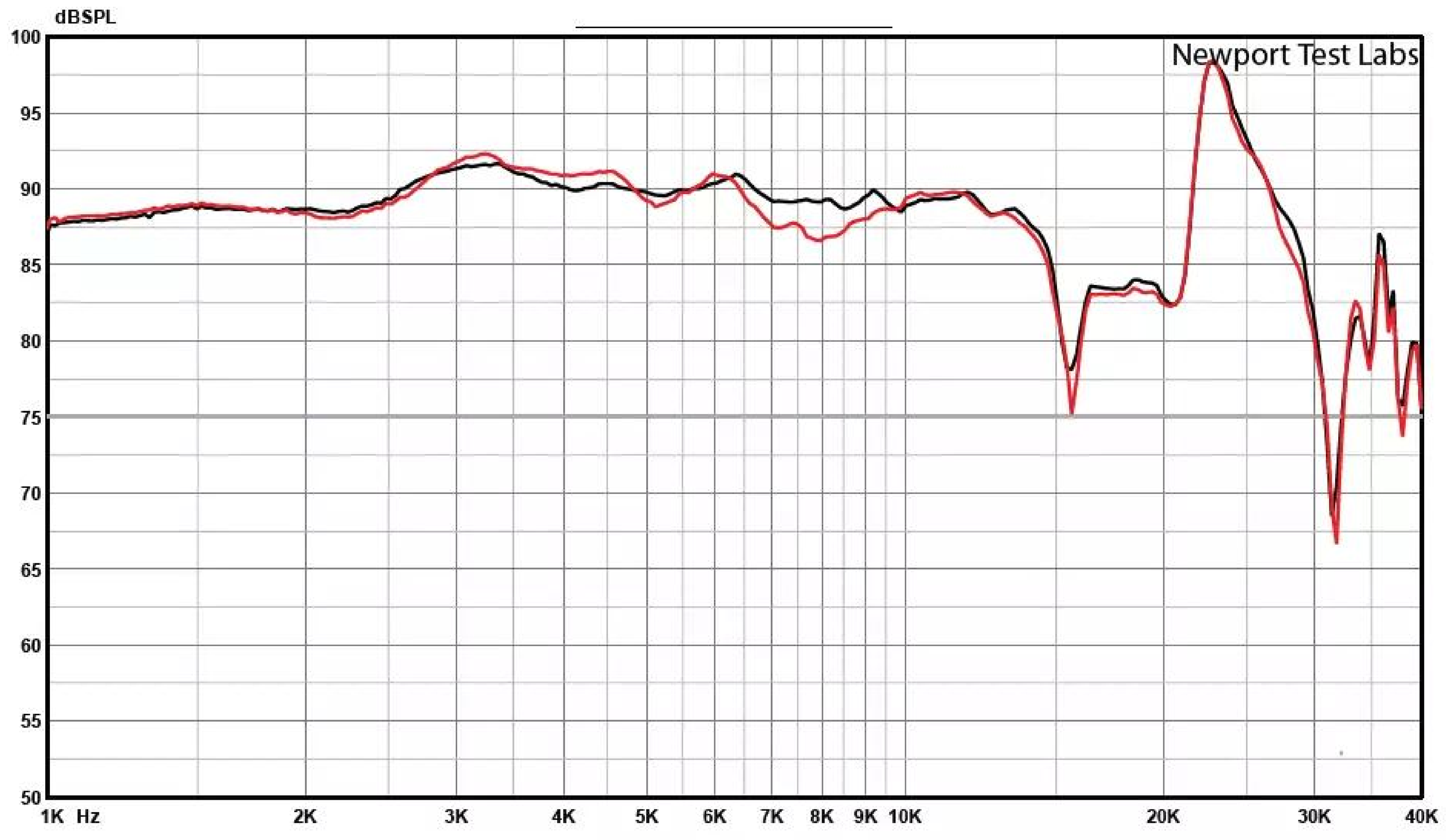
It's worth noting that the highest note on the piano keyboard — one that's rarely, if ever, played in the normal scheme of things! — has a frequency of 4.186kHz. So the musical note 'C' (an octave higher) would be 8.37kHz, and the 'C' an octave higher again would be 16.74kHz, somewhat higher than most people over the age of 30 can hear.

Newport Test Labs measured the low-frequency response of the PSBs using a near-field measurement technique that replicates the response that would be obtained in an anechoic chamber, the result of which is shown in Graph 3. This graph clearly shows the 'transitional' arrangement of the crossover network, with the solid traces revealing the output of the bass drivers, and the same-coloured dashed traces showing the output from the relevant bass-reflex port on the speaker's rear.

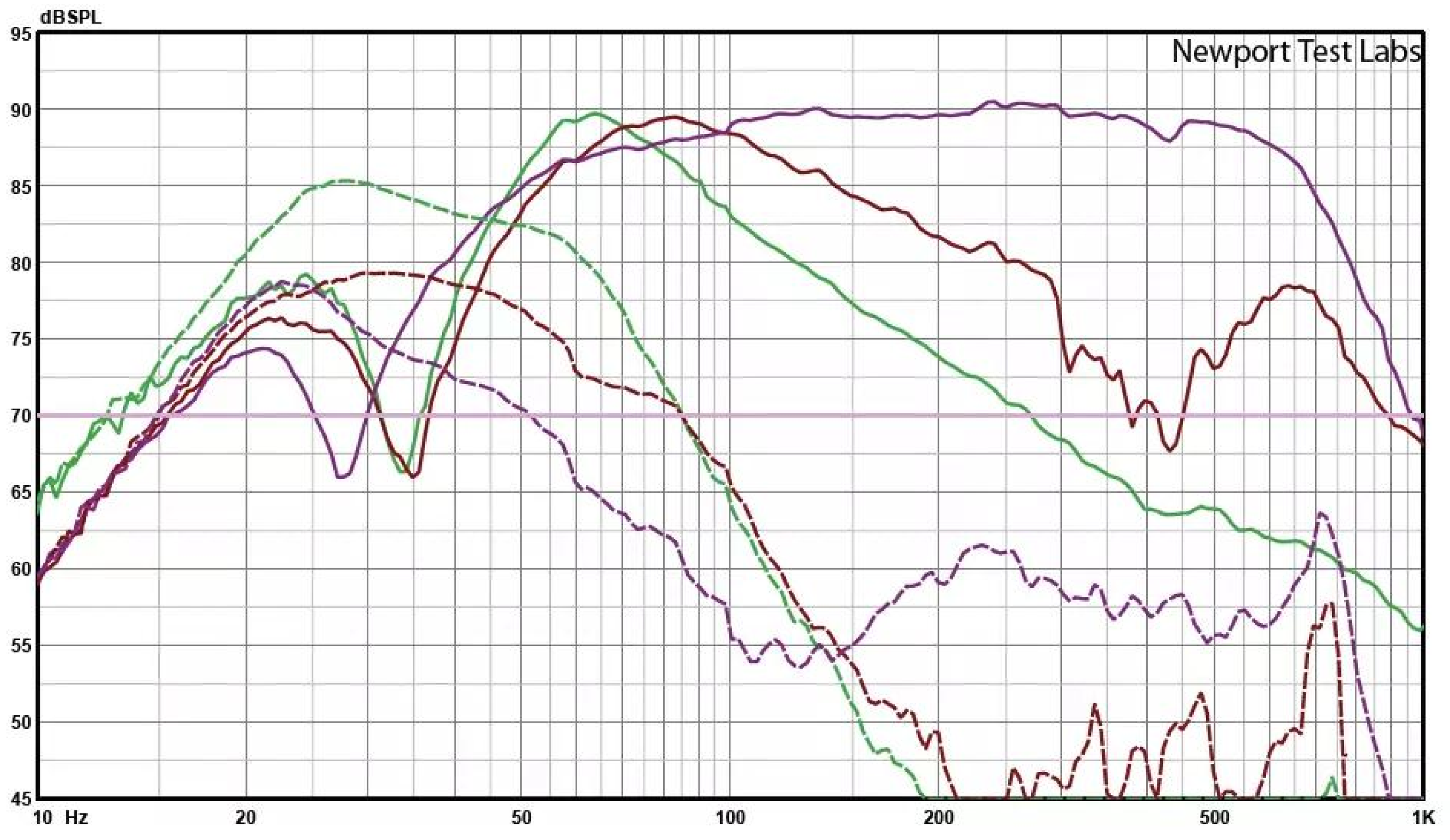
You can see that the lowest bass driver on the



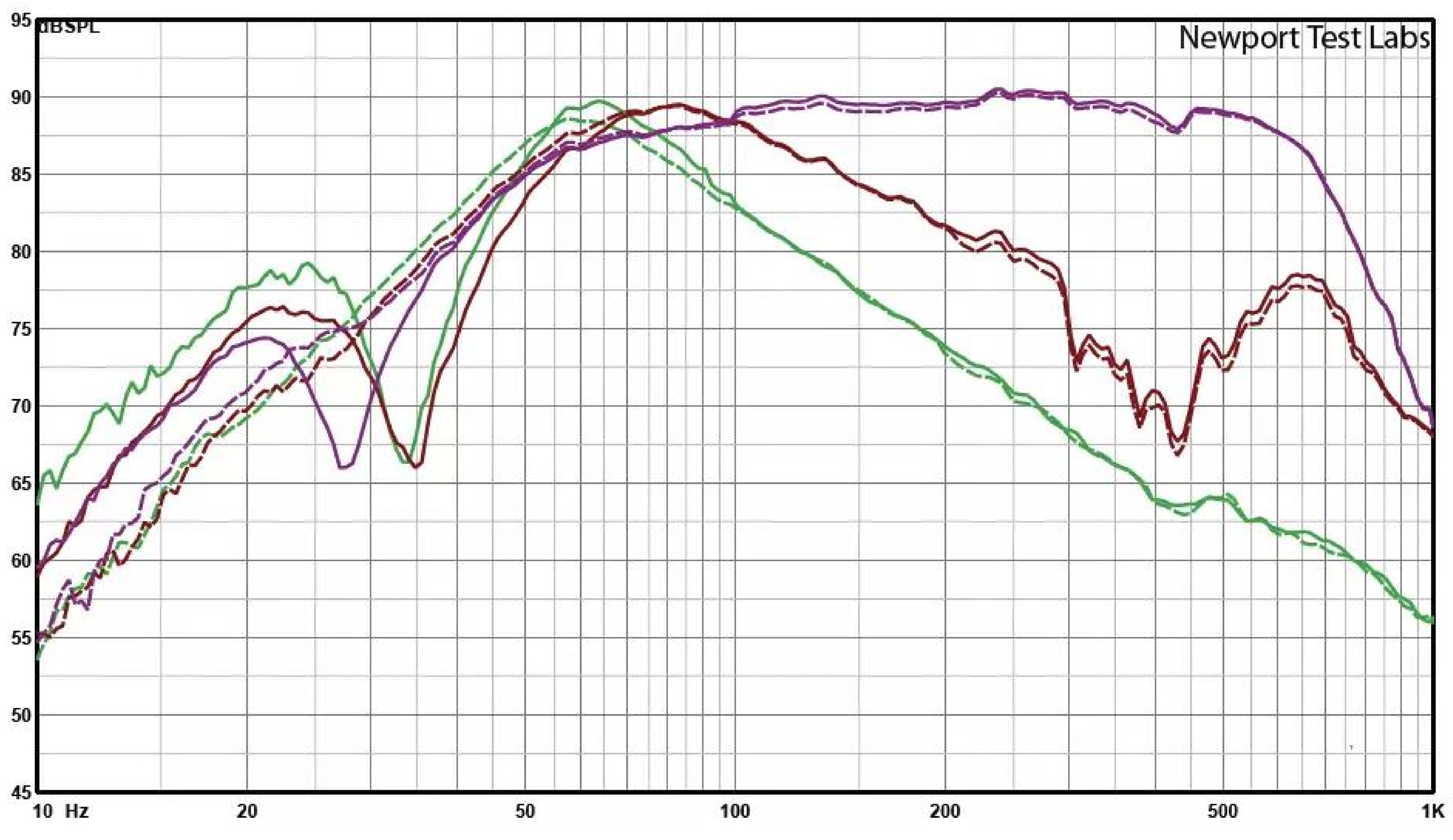
Graph 1. Frequency response (in-room). An average of nine traces, with the centre point on-axis with the tweeter.



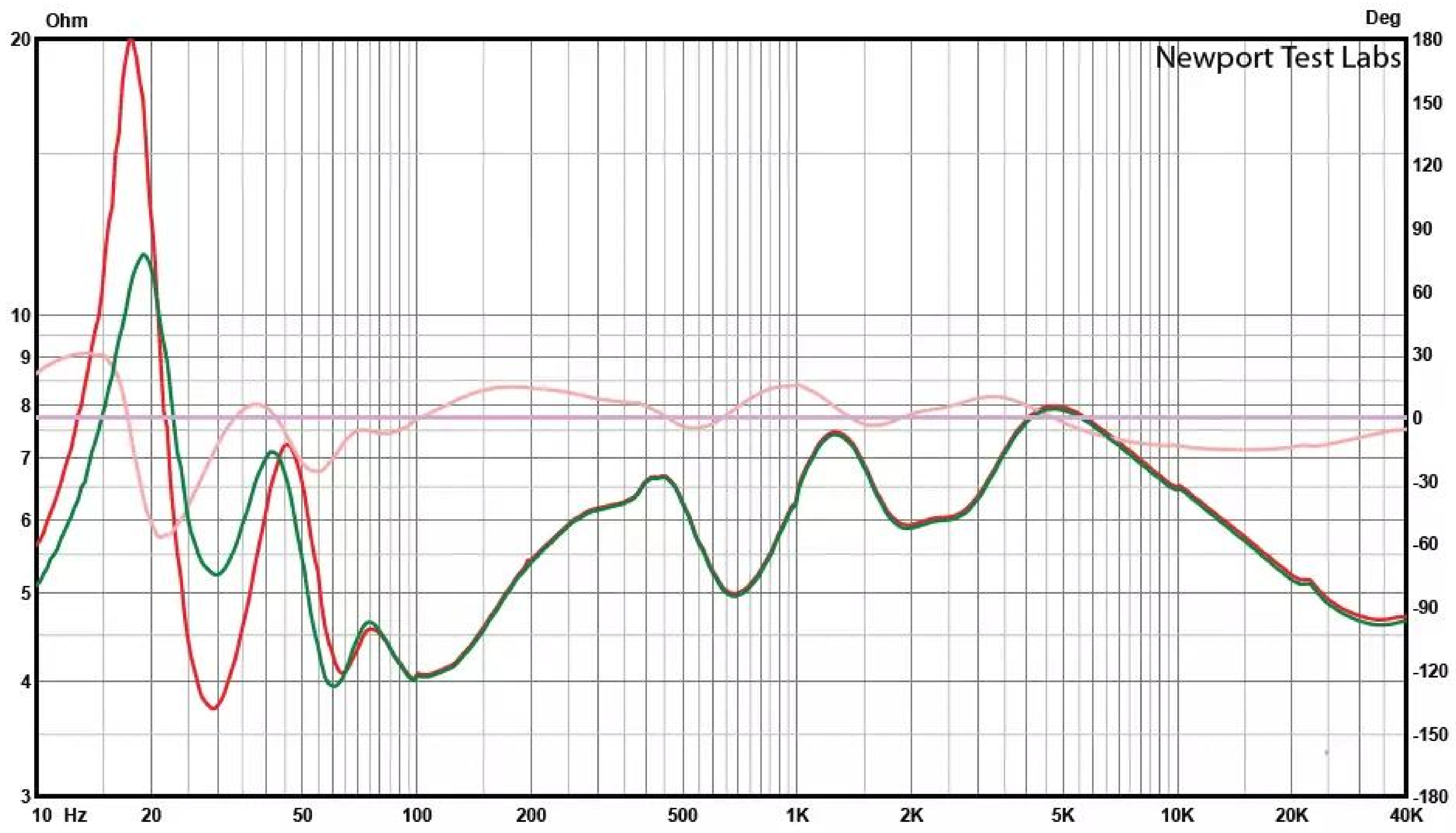
Graph 2. High-frequency response (anechoic), grille on (red) vs grille off. Lower measure limit is 1kHz.



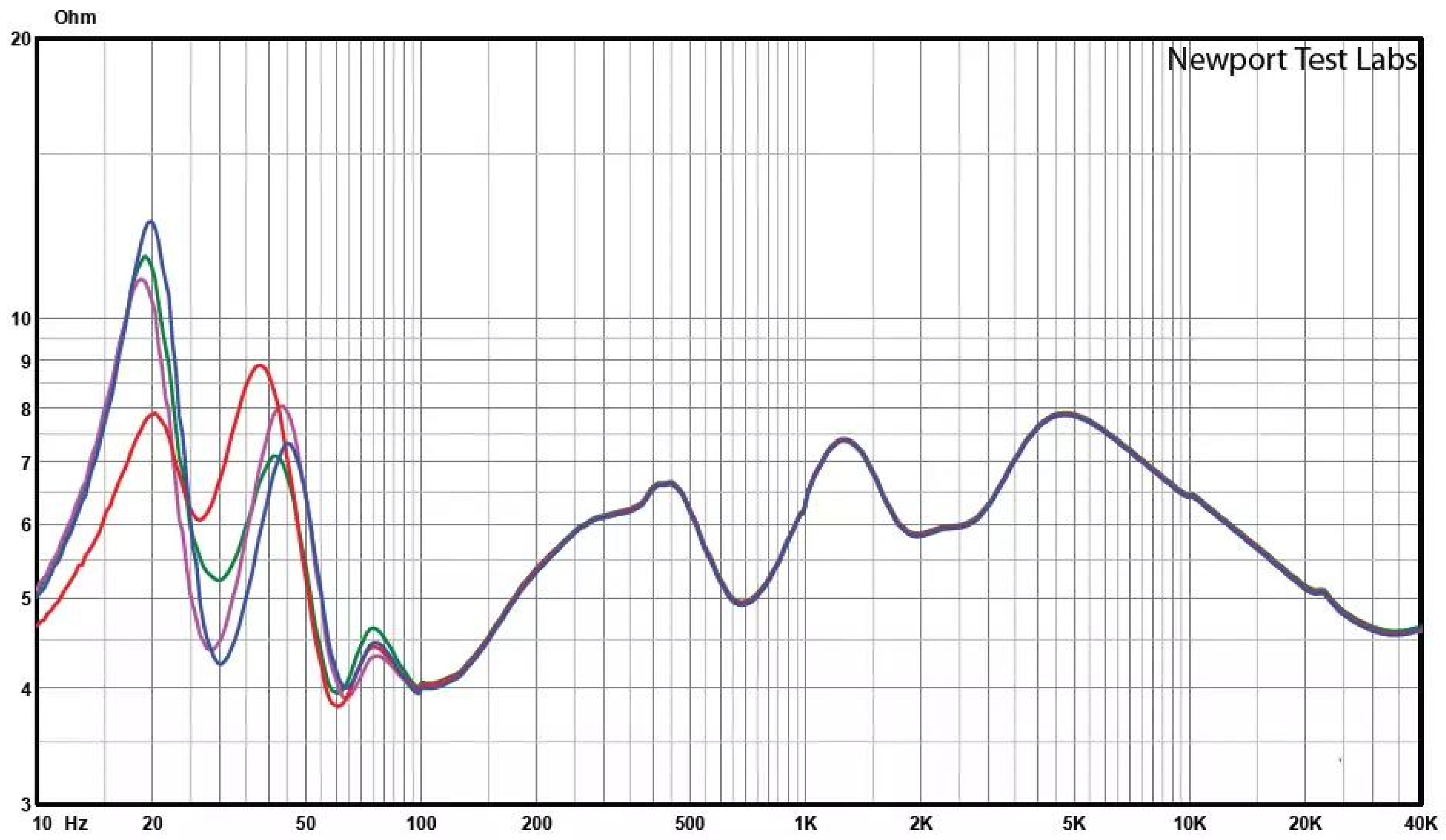
Graph 3. Low-frequency response of drivers and ports. Nearfield acquisition.



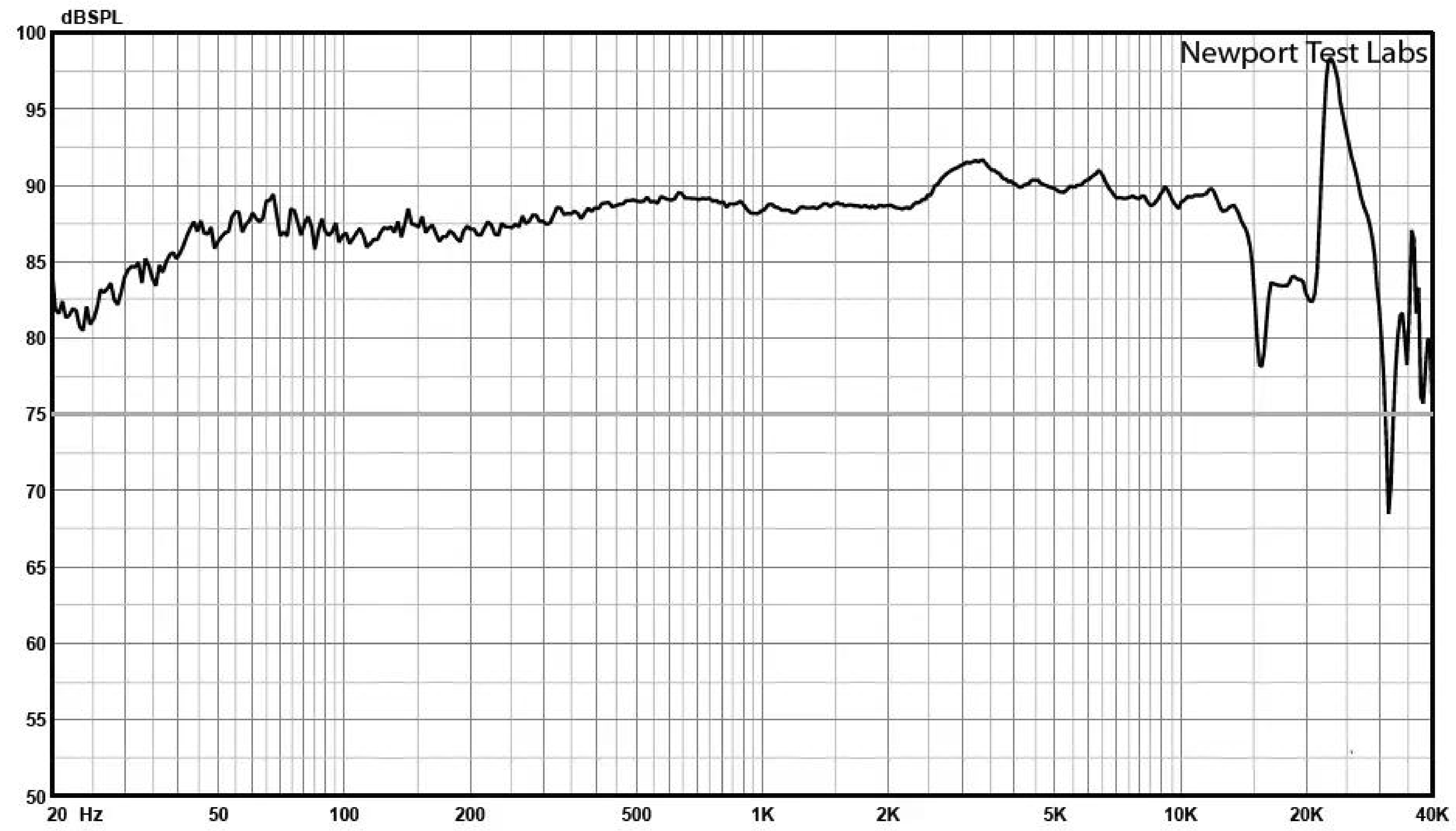
Graph 4. Low-frequency response showing the effect of port bungs. Nearfield acquistion.



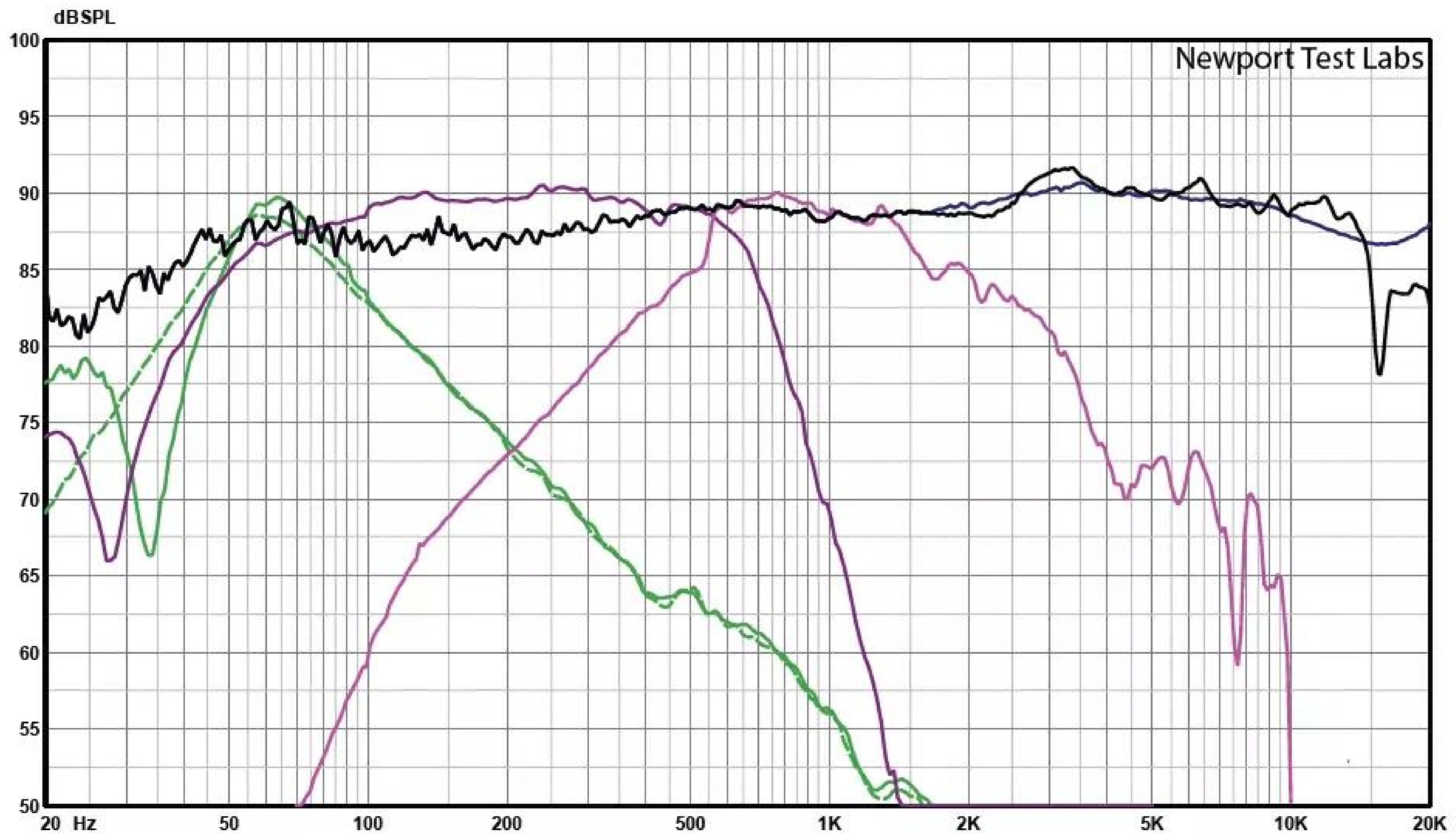
Graph 5. Impedance (red trace: no bung, green bung lowest port only) and phase (pink trace).



Graph 6. Impedance using other bung configurations.



Graph 7. Frequency response (composite). Room response spliced to anechoic high-frequency response at 1.5kHz.



Graph 8. Composite frequency response including the midrange driver.

front baffle (the green trace) has a very restricted output — one that rises from a minimum at around 34Hz to a maximum at 65Hz, after which it is rolled off very quickly by the crossover network, to be 20dB down at around 180Hz. The driver above (the brown trace) comes up from the same minimum to deliver its maximum output at around 85Hz, after which the crossover rolls it off much more slowly, so that it isn't 20dB down until about 400Hz.

As Graph 3 also reveals, the flattest and most extended response is delivered by the bass driver highest on the front baffle, whose response is shown by the purple trace. It starts from a minimum that is lower in frequency than the other two bass drivers (about 27Hz), then rises smoothly to around 110Hz, after which its output is not rolled off prematurely in the manner of the other two drivers but instead remains at the same level out to almost 500Hz, before being rolled off by the crossover. (The midrange takes over at this point, as shown in Graph 8.)

You can see that the output from each bass reflex port is controlled, though there is obviously some unwanted leakage at about 710Hz. Fortunately, it's too down to be audible. I do note that *Newport Test Labs* has, in the process of rescaling the bottom-most bass reflex port's output (to compensate for the difference in radiating area between it and the driver), forgotten to normalise the level of the two traces: they should be 5dB lower down on the graph.

Graph 4 shows the effect on the bass response when the bass reflex ports are blocked off (the dashed traces) or unblocked (the solid traces). The trace colours are the same used for Graph 3. You can see that you'll get a great deal of control over the volume level of the lowest bass frequencies by using the port plugs and, of course, by positioning the cabinets near your room's boundary (usually a rear wall).

The impedance (red trace) and phase (pink trace) of the Synchrony T800 without any port plugs fitted is shown in Graph 5, and you can see that contrary to PSB's claim, impedance falls to a minimum value of around 3.7 ohms (at 29Hz). This means you should not expect much in the way of bass output below this frequency. Despite this, PSB can still define the T800 as being 'nominally 4 ohms' under the guidelines of the International Electrotechnical Commission (IEC).

You can see from Graph 5 that if you block off the lowest port, the impedance at 29Hz increases to 5.3 ohms, but it still falls down to around 4 ohms at 60Hz and 100Hz. Perhaps more significantly, you can see that the impedance is almost entirely lower than 8 ohms over the entire audio range. Phase angle is extremely well-controlled, presumably made easier by the transitional crossover network. The overall result of the impedance and phase means that the T800 will be easy to drive for any well-designed amplifier, no matter its type — Class A/B, Class D... or indeed valve.

Newport Test Labs has included measurements (on Graph 6) that show the impedance of the T800 using other bung variations (that is, not the 'no-bung' option, as that's obvious on Graph 5), and you can see that the impedance remains controlled in every option.

Graph 7 shows a composite response in which *Newport Test Labs* has used post-processing techniques to splice (at 1.5kHz) the low-frequency room response to the high-frequency anechoic response. Likewise, in Graph 8, the lab has super-imposed a selection of the various responses on one graph, allowing you to firstly see the 'fit' of the various responses, and secondly where the midrange driver's response fits into the overall picture.

Newport Test Labs measured the sensitivity of the PSB Synchrony T800 loudspeakers using its standard and very stringent test methodology, reporting a result of 88dBSPL (at one metre for a 2.83Veq input). This is higher than usual for a typical multi-driver floorstanding loudspeaker, but 1dB lower than PSB's specification (of 89dBSPL) for an anechoic environment, and 3dB lower than the official spec (of 91dBSPL) for a room environment.

The important takeaway here is that *Newport Test Labs'* measurement shows that the PSB T800 is more efficient than most other speakers. You won't need a whole lot of amplifier power to ensure high, unclipped volume levels in your listening room, so you could happily use a low-powered valve amp with the T800. I would recommend you use a more powerful amplifier, but realistically you won't need one delivering more than 100 watts of power per channel unless you have a very large listening room, in which case you could likely put a 200 watts-per-channel amplifier to good effect.

Overall, the PSB Synchrony T800 are very unusual — and unusually clever — loudspeakers that performed brilliantly well in all the tests performed on them by *Newport Test Labs*.

Steve Holding

Hulgich Audio: 'Swaussie' success

The collaboration between a talented, meticulous industrial designer and an equally talented and meticulous electrical engineer has led to the creation of astounding speakers from Hulgich Audio. Sure, such a collaboration is not unusual — but these Australia- and Swedan-based talents live more than 15,500 kilometers apart! **Tom Waters** sits down with Nick Hulgich to get the full story…

Tom Waters: ***First thing's first, tell me how Hulgich Audio started…***

Nick Hulgich: It all started a long time ago. I was just a kid, aged 10, growing up in Argentina, and tango (of course!) and jazz were played constantly in my house. I was also in my school choir; I was the percussionist. In those days it was very easy to get high-end gear, mostly from Japanese brands. Many of my friends had high-end systems, and I had a very nice entry-level Sansui system — cassette deck, turntable and an integrated amplifier. The father of one of my friends had a proper dedicated audiophile room, with a McIntosh integrated amplifier and big Tannoy speakers. When his father was out, we'd sneak into this room to play our music. That was when I discovered what high-end audio was all about. I loved the ceremony of putting on LPs.

His father soon discovered what we were doing and said that he'd better show us how to properly use the turntable before we damaged something! Those experiences stayed with me and I felt that someday I would have my own high-end system.

Feeling that speakers were central to good sound, I started building them. There were lots of decent, inexpensive drivers, so I thought it was something I could afford to do! My first speakers were MDF with no crossover — they weren't good-looking. They were tuned by me by ear — I was always curious about crossover design but it was difficult (and frustrating) to get proper information in those days — but they weren't even close to the sound quality of my friend's. (I had those first speakers for probably 20 years!). After that I built a few other pairs, trying different cabinet sizes and materials and better drivers, but, again, just basic crossover design.

Eventually I came to Australia and noticed the huge interest in hi-fi here. And the market was so much bigger — there were more speaker driver options available. I immediately got involved. Back then I was a curious industrial designer by trade, not an electrical engineer. The web was gaining momentum and I found it so much easier to find information. So, I started building speakers again. I built them for 10 years in the living room of my house — back when it was just me and my wife. The house was packed with my speaker models! I didn't sell any; it was still just my hobby.

And you have a business partner in Sweden…

I started building speakers in Adelaide by copying a few models I found online to try out at first, and then later I kept experimenting and playing with crossover design. I'd read articles and books about speaker design but none seemed to help me enough to get the sound I was after. After exchanging information with some speaker designers, I eventually found Göran Niréus… yes, in Sweden.

When I met Göran, I already had a few models, one of which was the Astor [now discontinued], at that time my biggest speaker. I asked if he'd like to help me improve them, and he immediately responded. He said I first had to buy a serious

Nick Hulgich builds multiple speakers in advance so he can order parts in bulk and streamline production

measuring system. He was straight to the point — he'd help me but I would need to understand a whole different world. It was a steep learning curve but he showed me what I needed to know. He almost gave up on me because he is such a super perfectionist!

I've learned with him that designing a proper loudspeaker involves extensive measurement and effort; it's not as simple as starting with a cabinet and filling it with drivers. Measurements are the sole means of obtaining the essential information required for the proper design of a loudspeaker. Determining the ideal cabinet volume for each driver, assessing distortion levels, evaluating driver dispersion, ensuring phase integration between them, and establishing the appropriate distance between drivers — these are all fundamental measurements conducted in our design process.

However, measurements constitute only 50% of the final process. The perception of sound is far too subjective to be accurately captured in any measurements we can conduct. What measurements fail to convey is the true essence of a speaker's sound. Aspects such as the level of transparency, the ability to resolve micro-details, and the 'speed' of the bass (etc.) cannot be deduced solely from numerical data.

For us, an optimal speaker design is a blend of art and science. It requires the expert combination of component selection, cabinet design and technical testing, coupled with exhaustive listening sessions — and all complemented by pleasing aesthetics.

You see it all the time on the web; the notion that if something measures well, it sounds good. While it's possible to create a decent-sounding speaker with good measurements, achieving greatness requires extensive hours devoted to voicing the speaker to find the perfect balance.

Currently, Göran is the technical engineer responsible for driver testing and selection, as well as overseeing the measuring process. Following this process, he provides me with the crossover design, allowing me to commence the voicing of the speakers. Typically, several adjustments to the crossover are made before we are ultimately satisfied with the final sound. I have specific preferences for what I desire.

The first redesigned and properly voiced Astor was the inaugural model sold under the Hulgich Audio brand in 2016. Marc Rushton at *StereoNet* expressed great interest in hearing them… and was so impressed that not only did he publish a positive review but also purchased them.

By the way, Göran wasn't completely happy with my choice of midrange driver, but I insisted on going with it. (I changed my mind on subsequent models!) It wasn't a bad driver really, but we found some inconsistencies across the bulk of drivers I'd purchased. Göran suggested that next time we should use SB Acoustic drivers, which we do exclusively now.

Ultimately, the Astor proved to be too large and challenging to construct, so I aimed for a speaker with a smaller footprint, retaining a substantial sound and overall improvement. This led to the creation of the Duke speakers. Before the Dukes were officially introduced in late 2018, we had already experimented with approximately 15 combinations to determine the most effective design. Collaborating with Göran has been a

fantastic experience. Both of us are direct and share the common goal of achieving the best sound possible. Our personalities and differences are secondary and less significant. With that said, we have developed a strong friendship.

What gear made up your first system?
My first system was, in fact, my father's setup. Although he typically played it only on the weekends, I used it constantly and so the family considered it my system. Tango music was his go-to on the weekends. As mentioned earlier, everything was Sansui. I believe the cartridge was by Empire, a brand I don't think is in production anymore.

Your business isn't a brick-and-mortar model, instead you sell direct to customers. Has that been challenging?
The hi-fi market is exceptionally challenging. Breaking into the entry-level segment is particularly tough, especially when manufacturing products locally in Australia where labor costs are high. It's intensely price competitive, presenting significant challenges for us. I've observed the design flaws in cheaper speakers, especially in the crossovers, the hidden parts. Coils are placed without consideration for positioning to prevent interference, a flaw I've seen even in super-high-end brand speakers, though I won't mention names.

Proper layout to avoid interference is crucial and easily measurable. I meticulously build all the crossovers using high-end components, measuring each component before assembly. I'm extremely meticulous, ensuring the coils measure identically across pairs, even trimming them to achieve precision. I've accumulated bags of copper clippings from these coils, which my son Mario sells to earn extra cash!

Working with Göran, we were confident in producing high-end quality, and neither he nor I had any interest in anything less. When I entered this business, my goal was always to do the best I could. As a perfectionist, I avoid compromise and strive for something I can proudly put my name on.

Returning to your main question, a significant challenge we faced was building our numerous models. Initially, I built each model upon order, but this approach proved difficult due to varying tooling and components, making the process slow and cumbersome. It wasn't a sound market strategy. Consequently, we streamlined our models to focus on just the Nina [named after Nina Simone] and the Duke [named in honour of Duke Ellington]. I now build multiple units in advance, allowing me to order components in bulk and streamline production. While customers may prefer a different finish, I aim to build and stock the most popular ones, ensuring quicker delivery. This change was driven by the need to improve the quality of our products, marketing strategies and customer satisfaction.

Generally, many high-end speaker manufacturers don't produce their own drivers; most are built by four or five manufacturers. Larger manufacturers, like Wilson Audio, can afford to have drivers custom-made and then further modify them according to the speaker model. Unfortunately, we can't afford that luxury due to our smaller volumes. We use stock drivers made by SB Acoustics, which are excellent in terms of distortion levels and consistency. However, it is essential to note that selecting drivers alone won't guarantee good sound;

The Nina is a two-way standmount with an on-axis frequency response extension from 37Hz to 31 kHz.

creating high-quality-sounding loudspeakers involves many more considerations.

So you design, build and sell speakers. Have you considered marketing other products as well?

I concentrate on what we excel at, and both of us share a passion for designing and building speakers. We are committed to avoiding the diversion of our time by marketing additional products or engaging in the design and construction of items beyond our genuine expertise. We do offer our FTM (Feel The Music) speaker cables, originally created to provide a consistent speaker cable for testing various speaker models. However, I don't actively 'push' or market them as much, despite their fantastic quality, and only build them upon request.

I do believe in the significance of speaker and interconnect cables, but one needs to have a very good system to discern the differences between them. With that said, I prefer not to engage in debates about the merits of silver versus copper, for example. People have diverse preferences and requirements in cabling, depending on their combination of system components and the specific sound they are seeking. Delving into this discussion would divert us from our true passion. Therefore, we'll remain dedicated to speakers exclusively!

What are the biggest supply chain hurdles to get your products finished?

The most significant challenge by far is achieving the perfect finish on our cabinets. The painting and veneering of them are done overseas. I have encountered numerous issues related to delivery timing and quality. While the veneering can be satisfactory, the paint finish on our full high-gloss speakers, for example, has been inconsistent. The company responsible for this work has many large clients, causing our smaller orders to be pushed back, resulting in significant delays. Despite assurances that they will prioritise our work, it often turns out that they are outsourcing various jobs to complete the cabinets. Additionally, upon cabinet arrival, we often discover faults with the finishes, necessitating some to be redone!

This process is both time-consuming and expensive. While there has been interest from Norway, Germany and Singapore for our products, our inability to provide them in a timely manner hinders our progress, causing us to lose potential business. Currently, our primary market is Australia, but we aspire to expand when it's feasible to do so.

We would also ideally like to improve our representation across Australia. However, involving dealers to assist with this would significantly increase the price of our speakers, as they typically demand a substantial portion of the sale price. This would compromise the competitiveness of all our models. Additionally, I have noticed that people often prefer to communicate directly with me rather than a dealer, reducing the necessity for local dealers. Currently, we are exclusively working with Dacman Audio, who represents us in Melbourne.

Before Covid, the brand was gaining more attention and interest. I had considered a road trip around Australia to further boost this interest, but unfortunately the pandemic caused a decline in that attention. Now, my focus is to rejuvenate the brand by streamlining the models on offer and ensuring I maintain sufficient stock.

Speaking of Covid, we are currently able to acquire the components needed to build our speakers, and the supply chain has essentially returned to normal. However, the prices have skyrocketed. Many parts have experienced a 50% increase while some have doubled, and delivery costs contribute to this surge. Unfortunately, these factors make our speakers more expensive.

By the way, the recommended retail price of the Dukes is $26,000, and the Ninas cost $9,300. People at the recent *StereoNet* hi-fi show considered the prices to be quite reasonable given the sound quality and finish, which was very encouraging.

What do you think are the greatest challenges for the high-end hi-fi market on the whole?

I believe the most significant challenge is producing a true high-end product at a price point that more people can afford. Of course, many of these companies don't even wish to do that as they are targeting deep pockets. But you have to give them credit for their marketing strategies and the effort to create high-end-looking loudspeakers.

Take Rockport speakers, for instance. Observe how they construct their cabinets; that's undeniably high-end. These are the types of true high-end products I'm referring to, even though reproducing good sound involves much more than just creating a robust and beautifully designed cabinet. I haven't heard them yet, but I assume they sound pretty good too.

Of course, the number of people/businesses between the manufacturer and the end customer is a significant problem — each one wants a substantial cut, pushing the sale price up astronomically. Today, many people can no longer afford true high-end products. When you see the price of a pair of speakers go up by $20,000 in a week just because the brand is now carried by a different distributor, that should raise a lot of red flags. I believe the industry needs to find a way to improve the situation, although admittedly I don't have the answer. You already see high-end shops struggling to stay open; more will close. Many businesses are closing their physical shops and selling products out of their homes.

Another challenge is, of course, getting more young people into hi-fi. The typical age of my customers is around 45 years. There were many young people at the recent hi-fi show that loved the Hulgich Audio sound and appeared interested, but in most cases they can't afford a real high-end system due to economic reasons or priorities.

Outside of audio, what do you do for fun?

I don't have much spare time! Prioritizing disconnection is essential for me. So I might spend time playing golf — I find enjoyment in the walk as much as the game itself. Recently, I've been playing with my son, who tends to collect more balls than play! While I have a love for tennis and soccer, my body doesn't appreciate them as much anymore. Cooking is another activity I enjoy, especially hosting BBQs with friends and family. However, what truly brings me joy is connecting with nature.

The new Hulgich Audio website is now live at **www.hulgichaudio.com**

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5	Have a nice coffee	There's a coffee shop three doors down in the Mall, mate	Make your own
6	Purchase with pride	Purchase in ignorance	Purchase with fear
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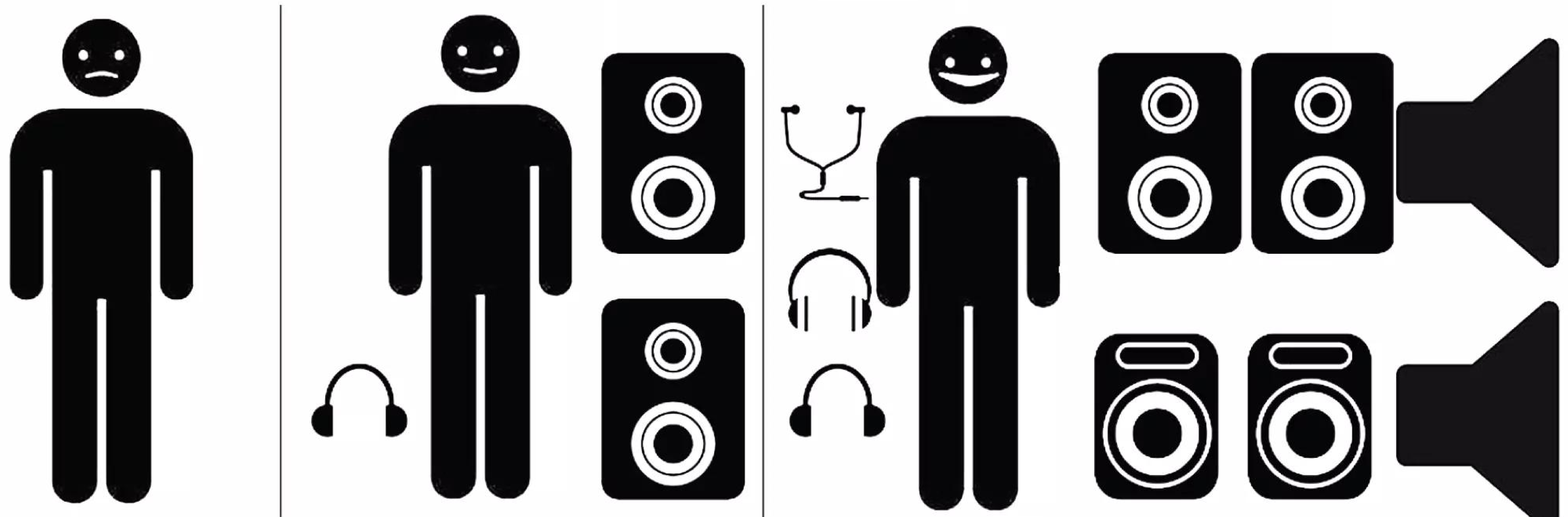

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11 wonderful piano tracks to test your system

Words by **Harry McKerrell**

Is there any single instrument more versatile, expressive and downright important than the humble piano? Ever since Bartolomeo Cristofori (thank you, Google) decided to innovate a percussive method of sound production by having the key of the would-be piano struck with hammers rather than plucked *à la* the harpsichord, the piano has been a mainstay of Western music — one whose popularity and importance is yet to be surpassed.

Hopefully, then, this list of piano tracks to test your hi-fi system reflects the bewildering array of styles, compositions and influences housed within the humble wooden frame of what is arguably the greatest instrument ever conceived. From rollicking Rachmaninoff concertos to Debussy's glossy genius to works from some of today's best ivory ticklers, here you are sure to find something worthy of your, and your system's, attention...

Erik Satie

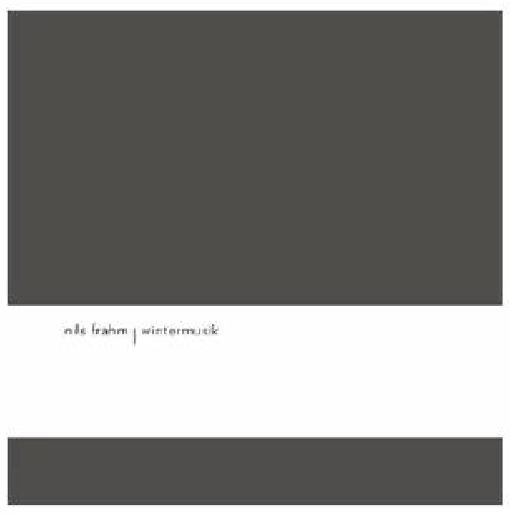
Gnossienne: No. 1

Aside from his exquisite 'Gymnopédies', Erik Satie's 'Gnossienne' is possibly the Frenchman's most accomplished and acclaimed composition. One of the most recognisable works by one of the main drivers of the classical minimalist movement, *Gnossienne No. 1* is a grave, sombre march defined by a clear expressive voice as much as by detail, timing or balance.

We're choosing *No.1* as the pick of the bunch, but if you have the time to test them all, each of Erik Satie's Gnossiennes should feel decidedly lavish and three-dimensional in spite of their often bare instrumentation. Ah, to be in a smoky café on a rainy evening in Paris. With a croissant.

Nils Frahm

Ambre



The German's expansive catalogue of predominantly piano-focused works is never far from reach during testing, mainly because its fine, glassy textures are ideal for assessing how well new kit can bring out those very specific piano tones. *Ambre* is a fine example, a quiet, glistening track that should invoke feelings of mystery, calm, contemplation and melancholy if your speakers and/or set-up are working correctly. *If*.

Ludwig van Beethoven

Piano Sonata No.8 in C Minor (Pathétique)

Nevermind the hi-fi, if you're a pianist who desires a decent finger workout that's also a lot of fun to play (once you get it nailed, of course), Beethoven's *Sonata No. 8 in C minor, Op. 13* has to be high on your list. The erratic German genius packs everything into his *Pathétique Sonata*, stuffing it with a range of styles, forms and sometimes even genres to create a concoction that veers from massive, thumping opening stabs to complex underhand runs all the way through to romantic interludes and intricate polyphonies. Pretty much a test of everything, then.

Sergei Rachmaninoff

Piano Concerto No. 2 in C Minor

Sergei Rachmaninnoff's most famous work is also without question one of his finest. Typifying everything that the Russian great brought to the Romantic period, his *Concerto No.2 in C Minor* incorporates a raft of styles, techniques and flavours into one incomparable package. Central to it all, of course, is the piano itself, combining note-laden runs alongside belting chords as well as steadier passages and phrases which grow, mature and then fade like waves crashing against a flinty shore. The usual necessity to listen to how the entire orchestral composition is handled applies here, of course, as does an ear for detecting how your speakers are conveying the contrasting voices and capabilities of that central piano performance.

Muse

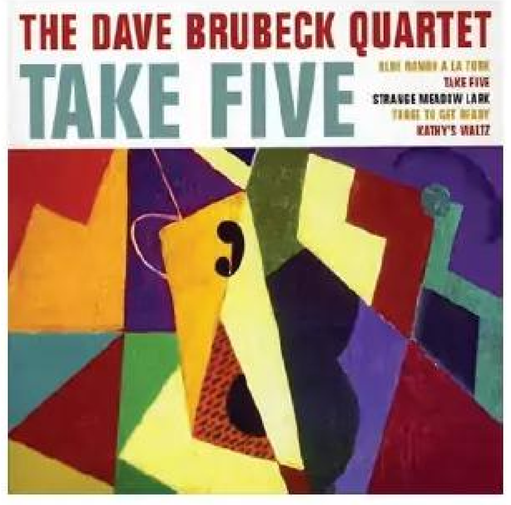
Butterflies And Hurricanes

Butterflies And Hurricanes starts off a pretty decent test track in its own right as a prophetic, overly dramatic stadium rock anthem, but it's Matt Bellamy's virtuosic solo around the song's three-minute mark that sets it apart as an awesome piano piece worthy of the finest equipment you can find. Heavily inspired by Rachmaninoff's expansive use of descending and ascending runs and supported by dense, clunking chords, you'll want to hear every single note as Bellamy's fingers run up and down the keyboard with startling agility.

And if you're looking to delve a little deeper into the rabbit hole that is Muse's eclectic back-catalogue in the search for more piano workouts, highly recommendable is *Apocalypse Please*'s thudding, doom-laden ►

chords and the eerie, glossy tones of the highly technical playing on *Space Dementia*.

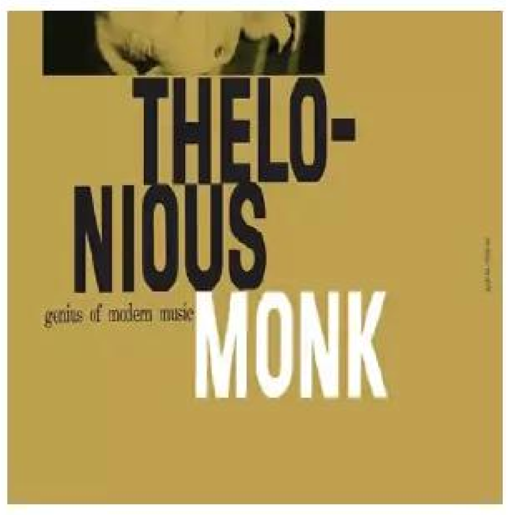
Dave Brubeck
Blue Rondo à la Turk



No, your eyes do not deceive you, this is not a typo; on this list is a Dave Brubeck Track that isn't *Take Five*. It's great, sure, but after a time you can become worn down by its ceaseless repetition as the go-to test track for checking out things like control, tempo and rhythmic flow. And let's be honest, it's not the only song Dave Brubeck ever wrote.

How about *Blue Rondo à la Turk* instead, a playful, cheery little number that sees Brubeck's off-kilter sensibilities brought to the fore most acutely. Here the sax and piano are at once in tandem and in conflict, fighting for the main melody as the drums skitter most tentatively underneath. There's plenty of dynamics on display, too, so make sure you're always aware of how that feeling is being conveyed by the piano line even when other instruments seem to take centre stage.

Thelonious Monk
Blue Monk



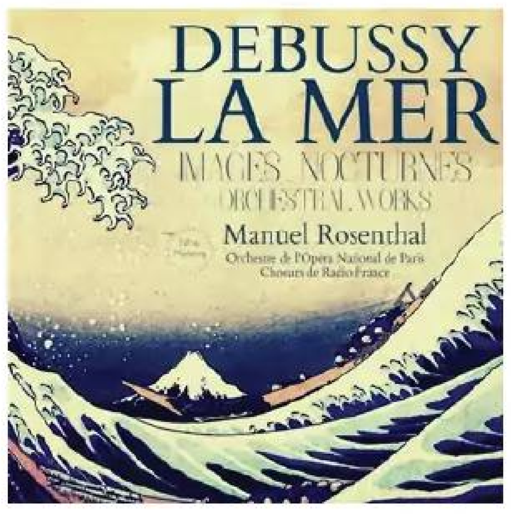
As is the case with most jazz and blues, Thelonious Monk's loose, improvisational style of playing requires hi-fi with a proper understanding of rhythm, feel and dynamics.

Blue Monk starts with Mr. Monk simply noodling away on the keys as a straightforward bass and drum kit accompaniment potters along in the background. As more instruments come into play, a sense of organisation is key to tying in the saxophone, bass, drum kit and piano all together without it turning into a cacophonous mess.

Ludovico Einaudi
Night

Night is typical Ludovico Einaudi, if a little more ominous and foreboding than many of his most famous works such as *Le Onde* (also great) and *Experience*. The simply named track is a two-hander between those distinctive Einaudi arpeggios and sequences sitting underneath a more vibrant, dynamic violin accompaniment. See if you can still pick out what the piano is doing (and *vice versa*) when the two instruments combine, while checking for whether or not the music is giving you the intended emotional response.

Claude Debussy
Pour le Piano, L.95, 2. (Sarabande)



Claire de Lune has long been a perennial favourite for hi-fi testers and music journalists thanks to the immediate familiarity of its signature expressive textures which are so indicative not only of Debussy's work but of the Romantic era itself.

We thought we'd switch it up, though, with another of the great French composer's compositions. *Sarabande* isn't Debussy's most famous or renowned piece, yet it's an absolutely sublime work that stands up perfectly as a test track thanks to its lush, dense chord progressions, rubato rhythmic interpretations and constantly evolving dynamic landscape. The accompanying sheet music recommends *Sarabande* be played "avec une elegance grave et lente" (with a serious and slow elegance). See if that comes across when you fire up your speakers.

Martin O'Donnell & Michael Salvatori
One Final Effort

Admittedly, there are better tracks for seeing how well a system conveys the subtleties and character of the piano as a unique instrument. Few are as good, however, for giving you an idea of how your speakers deal with excitement and drama as the rollicking epic *One Final Effort*, an endlessly enjoyable romp that starts life with dramatic upper-range chords before kicking into its signature theme and sending your adrenaline spiking to post-bungee jump levels. For reference, this is part of the music that plays at the climax of 'Halo 3' as you flee a collapsing megastructure on a military four-by-four while gunning down enemy aliens with an onboard machine gun. So... see if your equipment gives you a sense of all that happening as you listen.

George Gershwin
That Certain Feeling

You might've been expecting Gershwin's *Rhapsody In Blue* here. It's a seminal piece of work (seminal being synonymous here with "overused") and many understandably love it as if it were a dear relative, but you've probably been recommended it more times than your doctor recommends going for a run and eating more broccoli. Instead, enjoy a slice of *That Certain Feeling* and its typically Gershwin blend of classical, romantic influences colliding wondrously with those unmistakably loose inflections of the early 20th Century's jazzy spirit. It's almost as if there are multiple personalities fighting it out within what is one of Gershwin's lesser-known compositions, making it ideal for seeing how well your system picks out moods, tones and voices.

Peter Gabriel

i/o

REAL WORLD RECORDS

The last time Peter Gabriel released a whole album of original material was in 2002. John Howard was prime minister, Wikipedia was just getting started, and the Twin Towers in New York had barely been down a year. Given the passage of time, one has to wonder about the voice, which tends to weaken and lose precision when a singer crosses the threshold into senior citizenship.

Thankfully there are no such worries with 'i/o', Peter Gabriel's 10th solo studio album, with his soulful larynx projecting even more gracefully than he did on Genesis' 1969 *Where The Sour Turns To Sweet*. Moreover, he has the same range he drew upon for *Supper's Ready* — the surrealist prog opera from his old band's fourth album 'Foxtrot' — still at his disposal. Genesis themselves closed for business last year, so to hear Gabriel soaring undiminished feels like something of a miracle.

He can still write songs that turn the head and stir the heart, even if it takes him a little longer these days. *Playing For Time*, a ballad about mortality that begins with a motif from Chopin's Marche Funèbre and takes in the hymnal shapes of an old spiritual, feels like a song for the ages. It has the gravity of a *Blood Of Eden* or even a *Don't Give Up*, though where those songs were performed with Sinéad O'Connor and Kate Bush, respectively, here it's Gabriel on his own.

Most of the songs on 'i/o' have already been released, drip-fed throughout the year to coincide with the lunar cycle. Accompanying each track has been specifically commissioned art, created by some of the world's most renowned artists, including Ai Weiwei and Olafur Eliasson.

The first of these singles was *Panopticon*, which references both philosopher Jeremy Bentham's cylindrical prison, the panopticon, and the digital moguls who harvest our data and spy on us. It's a barnstormer in the Gabriel songbook: cogent, catchy and thought-provoking, and also a signifier of the album's big themes. There are songs about terrorism *(Live And Let Live)*, injustice *(The Court)*, locked-in syndrome *(Road To Joy)* and interconnectivity (*i/o* itself). Despite their dark themes, they're really about uplifting in difficult times, and musically we're in the safest of waters.

With Gabriel there always has to be some kind of innovation, and here we have different mixes for each track by two of the world's most celebrated engineers: Mark 'Spike' Stent (Madonna, U2, Ed Sheeran) provides the Bright-Side mixes, and Tchad Blake (Elvis Costello, U2, Sheryl Crow) brings the Dark-Side mixes.

Gabriel recently joked that fans receiving a song each full moon was like them "getting a Lego piece each month". By that measure, 'i/o' is a veritable sonic Legoland.

Dolly Parton

Rockstar

BUTTERFLY/BIG MACHINE

Thundering over the horizon like a stampeding herd of glittery elephants, Dolly Parton's 49th studio album is a 30-track sprawl of guitar-revving soft-rock originals, classic cover versions and superstar duets. It is also the 77-year-old Queen Of Country's most deranged project yet — a towering wedding cake of syrupy excess and Elvis-in-Vegas naffness. Seven decades of rock and pop history are mulched together here, from a huge treacle-drenched *Let It Be* featuring Paul and Ringo, to hen-party karaoke versions of *Stairway to Heaven*, *Purple Rain*, *We Are The Champions*, and more. Parton's tremulous, twangy voice retains its piercing emotional power even at maximum cheese levels, but there are some unexpectedly lovely moments too, such as the Parton-penned power ballad *My Blue Tears* featuring Simon Le Bon's luminous harmonising. What other living icon could unite Joan Jett, Sting, Rob Halford, Lizzo, Nikki Sixx, Steven Tyler, Debbie Harry, Stevie Nicks, Elton John and others across a single album like this? Amazingly, Dolly even managed to dodge the obligatory Dave Grohl cameo! A monumentally hideous yet strangely glorious album.

King Crimson

Music Is Our Friend

PANEGYRIC

Vinyl fans can now celebrate what is likely to be King Crimson's final performance, in Washington DC in September 2021, with this triple set. With the band having ground to a halt twice in the first decade of this century, hopes were not high when Fripp re-formed the band in 2014, particularly as there had been no new material since 2003. But the self-proclaimed "seven-headed beast" featured three drummers that precipitated a major overhaul of the back-catalogue. The results were clearly audible on 2016's 'Radical Action' and the changes have continued since. Indeed, the pandemic pandemonium that surrounded their 2021 US tour seemed to spur them on. *Neurotica*, from 1982's 'Beat', was added to the setlist, along with the restored middle section of *Larks' Tongues In Aspic Part 1*. There are memorable renditions of *Starless* and *Islands*, and an awesome encore of *21st Century Schizoid Man*, one of three tracks from their 1969 debut.

Storm Deva

Storm Deva

STORMDEVA.BANDCAMP.COM

Creative and romantic partners Carollyn Eden and Dr Stuart Clark met in 2012 at an interactive science theatre event, and first played together five years later in the earthy environs of London pub The Spice Of Life. But Storm Deva is no whirlwind affair. The duo have put much time and detail into this debut, carefully connecting their shared influences of progressive rock, folk and classical music and engaging John Mitchell as producer. Eden's strong, expressive soprano and piano work lead each track, from the forceful *Carpe Diem* (which has the merest hints of Ghost and Opeth) onwards. Soon, Clark's love of guitar emerges with some deft electric soloing on the title track and *Garden Of Wisdom*. The song stories depict transformation, empowerment and release in dramatic settings of multi-tracked harmonies and orchestration. Kate Bush and Iamthemorning are influences as Eden's vocals flutter and fly on tracks like *Believing*, but reined in as a chamber ensemble, with nods to musical theatre works such as Wicked. Ambitious but not overcooked — a promising start.

Van Morrison

Accentuate The Positive

EXILE

A welcome recording from Van Morrison for several reasons. Firstly, his recent albums have tended to accentuate the negative, with their occasional diversions into the world of conspiracy theory. Musically, too, they've avoided the long, passionate workouts of his best records, leaning heavily on his R&B roots. For some, it's a long way from the poetry and mysticism of Morrison's best work. So it's something of a relief that 'Accentuate The Positive' is, purely and simply, a covers album, a collection of songs taken mostly from the middle of the 20th century, arranged in the style of whichever R&B, country or rock'n'roll version means the most to him, and performed with the majestic casualness that only he can bring to a song. He sticks closely to his favourite arrangements, but, being one of the great geniuses of popular music, also manages to make these hairy oldies his own. There's a lot of material here, enough to fill a small jukebox, from a gorgeous take on *You Are My Sunshine* to a fantastic, knee-trembling *Shakin' All Over*, and it all works.

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